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## Laparoscopic Versus Open Mesh Repair of Inguinal Hernia for Military Personnel

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### ABSTRACT

**Background:** An organ or fatty tissue, like the colon, might abnormally emerge through the wall of the cavity in which it normally dwells, a condition known as a hernia. Inguinal hernia repair is among the most frequently done procedures by surgeons worldwide. Treatment includes pure tissue repairs to prosthetic repairs under open or laparoscopic approach. Though so many options are available but none is superior to others. Aim of the study is to compare the effectiveness of laparoscopic hernia repair with open mesh hernia repair.

**Methods:** The study was a comparative cross-sectional study. The study, which took place between 2016 and 2018, involved 100 cases in the General Surgery department of Combined Military Hospital (CMH), Savar (30 cases of laparoscopic hernioplasty and 70 cases of open hernioplasty). Purposive sampling technique was used to collect data. Data were collected during follow up of patients by using a semi-structured questionnaire. Data were analysed by using Statistical Package for the Social Sciences (SPSS) version 26.0. Informed written consent were obtained from the patients and ethical issues were duly addressed.

**Results:** There were 100 patients in the study, 30 of whom were assigned to group A (the laparoscopic group) and 70 to group B (the open group). In group A, the mean operating time was  $103.67 \pm 23.57$  minutes, while in group B, it was  $50.26 \pm 2.57$  minutes. In group A, there was a decrease in pain scores, with 90% of patients reporting 1-2 (mild discomfort). Three people are in excruciating pain.

**Conclusion:** Inguinal hernia repair is a frequently performed general surgery treatment. Because of the large socio-economic impact of inguinal hernia repair, it is the responsibility of the surgeon to consider the most advantageous approach in each given situation. For all patients needing elective hernioplasty, laparoscopic, non-randomized, pre-peritoneal mesh repair for inguinal hernias is a safe, effective method that has clear advantages over open mesh repair.

**Keywords:** Inguinal Hernia, Laparoscopy, Open Mesh repair

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## INTRODUCTION

An organ or fatty tissue, such as the colon, might abnormally emerge through the wall of the cavity in which it normally dwells, a condition known as a hernia. Inguinal hernia repair is among the most frequently done procedures by surgeons worldwide. These days, the majority of surgeons favor doing tension-free mesh repairs. One of the methods for treating inguinal hernias that is currently most widely used is the Lichtenstein tension-free hernioplasty. It is among the surgical operations that are carried out most frequently worldwide. Surgical repair is the definitive treatment for all hernias, regardless of their type or origin, and it is performed every year worldwide.<sup>1</sup> Seventy-five percent of abdominal wall hernias are inguinal hernias, with a lifetime risk of 27% for men and 3% for women. Restoring these hernias is among the most often carried out surgical operations globally.<sup>2</sup> Compared to femoral hernias, inguinal hernias occur more frequently in the groin. Early in the 1990s, when laparoscopy became more popular in general surgery, laparoscopic inguinal hernia repair was developed.<sup>3-6</sup> It's also unexpected that there isn't agreement in the literature about the best prosthetic mesh or repair method to guarantee long-lasting outcomes.<sup>7-8</sup> Men face a lifetime risk of 27%, while women face a risk of 3%. Mesh has become very widely used in groin hernia repairs, nearly completely replacing suture repairs such should ice or Maloney procedures.<sup>9-11</sup>

There is debate regarding choice of surgical option for inguinal hernia repair especially in soldier's community. Studies mentioned that laparoscopy gained popularity by its short hospital stay, decrease pain, early return to activity, small scar, less recurrence with heavy military activities. This research aims to

compare laparoscopic and open inguinal hernia repair, capitalize on the latest advancements in laparoscopic surgery, and increase the use of laparoscopic hernia surgery within the military community. We contrast the benefits and drawbacks of Lichtenstein repair with laparoscopic surgery.

## MATERIALS AND METHODS

This was a comparative cross-sectional comparative study. The study involved 100 cases in the department of general surgery, CMH Savar, over the course of three years from 2016 to 2018, with 30 cases assigned to group A (laparoscopic group) and 70 cases assigned to group B (open group). Open and laparoscopic options were given to the patients. According to the choice of the patients and judgment from ethical committee of hospital surgical procedure was performed. Purposive sampling technique was used to collect data. Certain criteria for selecting the cases was followed-

Medically fit, unilateral or bilateral inguinal hernia, soldiers waiting for foreign mission, foreign course and promotion.

Soldiers over 50 years old, patients with serious inguinal hernias such as obstruction, strangulation, or gangrene, and contraindications to general anesthesia (for laparoscopic surgery) or regional anesthesia (for open repair) were the exclusion criteria.

If patient is not fit for G/A, open Lichtenstein repair was performed. Operative steps and complications were recorded meticulously.

Proportions and percentages were used to represent qualitative data. The mean and standard deviation were used to express quantitative data. All statistical tests were performed using SPSS (Statistical Package for the Social Sciences) version 26.0.

**RESULTS**

The study included 100 patients among those 30 cases were placed in group A (30%) (Laparoscopic group) and 70 cases (70%) were placed in group B (Open group).

**Table-I:** Distribution of the patients according to sex (n=100)

Sex	Group A	Group B	Total n(%)
Male	30	68	98(98)
Female	0	2	02(2)
Total	30	70	100(100)
p-value	0.818		

Table I displays the patients' sex distribution; in both groups A and B, the majority of the patients were men, and in the open surgery group, there were only two female instances.

**Table-II:** Distribution of the patients according to age (n=100)

Age(years)	Group A	Group B	Total n(%)
21-30	12	12	24(24)
31-40	8	14	22(22)
41-50	3	13	16(16)
51-60	4	16	20(20)
>60	3	15	18(18)
Mean ±SD	36.90±13.97	47.60±15.27	100(100)
p-value			0.076

Table-II reveals the age distribution of the patients. Age ranges from 21 to >60 years were included in the study. In group A mean age was 36.9±13.97 years and in group B mean age was 47.6±15.27 years.

**Table-III:** Distribution of the patients according to co-morbidity (n=100)

Disorders/Co-morbidity	Group A	Group B	Total n(%)
DM	3	10	13(13)
HTN	4	4	8(8)
IHD	0	0	0(0)
No disorders	23	56	79(79)
Total	30	70	100(100)

Table-III demonstrates the patients' attributed disorders/co-morbidity; in group A, 23.33% of patients had associated disorders, while in group B, 20% of patients had associated disorders.

**Table-IV:** Operative data of the patients

	Group A	Group B	
Mode of repair	TAPP-10 e-TEP-10 TEP-10	Lichtenstein	
	n(%)	n(%)	
G/A	28(93.33)	0(0)	
SAB	2(6.67)	66(94.29)	
L/A	0(0)	4(5.71)	
Mean operating time	103.67 min	50.26 min	
Vascular injury	0(0)		
Fixation of mesh	Tracker	2-0 Prolene	2-0 vicryl

Table-IV shows operative data where in group A, 10 patients underwent e-TEP, 10 patients underwent TEP and 10 patients were TAPP. In group A only 6.67% patients were operated under SAB with sedation and others were under G/A. Mean operating time in group A was 103.67±23.57min. Whereas in group B, Lichtenstein technique were performed for all patients. Total 94.29% operation was performed under SAB and remaining 5.71% were under L/A. Mean operating time was 50.26±2.57 min.

**Table-V:** Distribution of the respondents by post-operative outcomes

Post-operative outcomes	Group A		Group B	
	n	%	n	%
Urinary retention	2	6.67	5	7.14
Pain	3	10	17	24.29
Hospital stay(mean)	2.4 days		5.5 days	
Time of Ambulation	8 hrs after Op			
Recurrence	0	0	3	4.29
Systemic Complications	0	0	0	
Seroma	1	3.33	11	15.71
Surgical site infection	0	0	7	10
Mortality	0	0	0	0

In table-V reveals post-operative outcomes. Pain score was detected by visual analog pain scale. 90% of the patients in group A reported mild pain, scoring 1-2, while 3 reported severe pain, indicating a considerable reduction in pain. The average hospital stay for groups A and B was 2.4 and 5.5 days respectively. No surgical site infection was found in group A but in group B, 7 patients developed surgical site infection. In group A, 1 patient developed seroma and in group B 11 patients developed seroma.

## DISCUSSION

Endoscopic inguinal hernia procedures have a lower rate of wound infection and hematoma formation than the Lichtenstein surgery, and they allow for a sooner return to normal activities or employment.<sup>1</sup> The majority of the patients in this trial, both in groups A and B were men. Two women underwent surgery in group B. Again most of the hernias operated were on the right side in both the groups. This indicates male has more inguinal hernia and more on right side.

Mean operating time in group A was 103.67 min and in group B is 50.26 min. Time started from the beginning of anesthesia and operation time can be varied from center to center and surgeon to surgeon. But there's no denying that experience plays a big part in reducing recovery periods, rates of complications and recurrences, and persistent pain and other long-term concerns.<sup>13</sup> While a good procedure is more crucial to the patient, the length of time it takes to complete the surgery may have financial consequences.<sup>14</sup>

41 trials comparing laparoscopic and open inguinal hernia repair involved 7161 patients, according to a Cochrane meta-analysis. The data indicated that there was a higher risk of major problems and that laparoscopic repairs

required operating periods that were fifteen minutes longer.<sup>15-18</sup> Schmidt et al. conducted a meta-analysis that included 34 trials and found that the average time needed for TAPP/TEP (65.7 min) was significantly longer than the time needed for the Lichtenstein repair (55.5 min).<sup>19-20</sup>

Post-operative pain scores were obtained using visual analysis scale (VAS).<sup>21</sup> In the present study less post-operative pain was found in group A (Laparoscopic group) when it was compared with group B (Open group).

In group A, 80% patients has mild pain (1-3), 15% patients has moderate pain (4-5) and only 5% patients have dreadful pain (6-7) but nobody has horrible pain. But in group B, 4% patients have mild pain, 40% patients have dreadful pain (6-7) and 11% patients have horrible pain (score 8-9).

Pain that lasts three months or more is classified as chronic pain by the International Association for Study of Pain (IASP).<sup>22</sup> With hernia surgery, there is a lower chance of chronic pain than with non-mesh repair. Thus, there is level A evidence that laparoscopic surgery results in decreased discomfort following surgery compared to open surgery. In this study multidisciplinary approach was followed for chronic pain management. After laparoscopic inguinal hernia repair, persistent discomfort is a multidisciplinary worldwide issue. A clinical randomized trial examining the effects of mesh implant features on chronic pain following laparoscopic inguinal hernia repair concluded that, regardless of the type of mesh put, 5% of patients still experience difficulty after five years.<sup>23</sup>

Compared to open treatment, laparoscopic inguinal hernia repair has a higher incidence of complications. All major problems in the MRC hernia study group happened in the group that

had laparoscopy.<sup>24</sup> Systemic assessments reveal an overall risk of problems following inguinal hernia procedures ranging from 15 to 28%.<sup>20,25</sup> Urinary retention, early pain, and hematomas and seromas (8-22%) were the most common early problems. Persistent pain and recurrences were the most common late complications.<sup>22,25,26</sup> Seldom were reports of life-threatening consequences made.<sup>26</sup> In the present study in group A 6.67% and in group B 7.14 % patients develop urinary retention.

In laparoscopic group one patient (3.33%) develops seroma and in open group 11 patients (15.71%) develops seroma. No surgical intervention or aspiration was done, gradually the seroma subsides. In laparoscopic group there was no wound infection but in open group 10% patients develop wound infection who were treated with double antibiotics and no surgical intervention was required. Mortality in both cases is nil. Even in advanced age, the risk of death after elective inguinal hernia repair is minimal. It is less than 1% in all series, and in a Swedish register research, it is not higher than the background population.<sup>27</sup> No recurrence was found in group A but 4.29% recurrence was in group B. Mean hospital stay in laparoscopic group A was 2.4 days but in group B 5.5 days. So post-operative hospital stay was less in laparoscopic repair than open hernia repair. None of the patient has serious vascular or visceral complications. This study demonstrates that laparoscopic hernia repair, as opposed to open hernia repair, is linked to a shorter length of stay in the hospital following surgery and greater comfort. In group A patients were discharged with only 2 weeks rest and advised to resume heavy activities after 2 weeks. But in open group 4 weeks rest was advised and was also advised to resume heavy activities after 6 weeks and to use lumber corset.

Regardless of the technique used during surgery, there is no proof that physical strain

(including heavy lifting) following groin hernia repair increases the chance of recurrence.<sup>13</sup> Studies suggest that patient undergoing laparoscopic hernia repair has shorter convalescence period in comparison to open hernia repair group. Time to return to normal activities depends on job pattern. As the soldiers need to work hard and perform hilly train duties, so the mentioning convalescence period had to follow. As the soldiers could early join to their daily activities and facing very less post-operative complications, laparoscopic hernia surgery was accepted in the hospital with great interest.

There is no evidence to support the assertion that the recurrence rates of laparoscopic and open repairs differ, despite meta-analyses suggesting that laparoscopic repairs had a lower prevalence of persistent groin discomfort than open repairs.<sup>28</sup>

Limitations of the study include single center study, small number of cases, short study period, no assessment quality of life (QOL).

## CONCLUSION

Laparoscopic hernia repair is the demand of modern time and it is accepted by the soldiers' community with great interest. It is safe, efficacious as it provides short hospital stay, early return to heavy activities, less post-operative pain, less morbidity, good cosmesis etc. Therefore, it was able to prove to the military community that laparoscopic pre-peritoneal mesh repair is safer and more successful than open mesh repair.

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