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Original Research Article

Comparison of outcome between laparoscopic inguinal hernia repair and open inguinal hernia repair

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ABSTRACT

Background: Laparoscopic and open surgery techniques have been explored, and each technique has its advantages and pitfalls. Therefore, this study intended to carefully evaluate and compare the outcome of operative duration, post-operative pain, post-operative analgesic requirement, and post-operative complications between laparoscopic inguinal hernia repair and open incisional inguinal hernia repair surgery.
Methods: In this comparative study, patients were divided into 2 groups, 25 patients underwent laparoscopic inguinal hernia repair, and 25 patients underwent open inguinal hernia repair. Visual analog scale (VAS), post operative analgesic requirement and complications were analyzed between groups.
Results: The mean age of open surgery patients was 43.12±12.51, while it was 44.67±18.22 in the laparoscopic group. Forty-five of the cases presented with unilateral hernia, of which 28 showed right laterality and 17 displayed left laterality. In 05 cases, bilateral representation was observed. The average duration of open inguinal hernia repair was 54.23±9.41 minutes, while laparoscopic took 68.94±12.35 minutes, which was statistically significant ($p<0.0001$). The post-operative pain in VAS just after and post 6, 12 and 24 hours were significantly lower with laparoscopic surgery. Seroma was the most commonly noted post-operative complication, especially in laparoscopic casesy.
Conclusions: The study found that the laparoscopic inguinal hernia repair technique was statistically superior to the open incision method in reducing post-operative pain and analgesic requirements. However laparoscopic method had a longer surgery duration as compared to the open surgery procedure.

Keywords: Hernia, Inguinal, Herniorrhaphy, Laparoscopy, Lichtenstein

INTRODUCTION

Hernia originates from the Latin word hernios, which means "rupture." It's defined as an abnormal protrusion of tissue or organ from various body parts. Ancient literature across civilizations has mentioned hernia. Hammurabi of Babylon documented hernia reduction and the use of trusses to minimize protrusion as early as 1700 BC. The ancient Egyptians described hernias in papyrus texts dating back to 1500 BC. Hippocrates described herniation as a tear in the abdomen in the 4th century BC. Maupassius and Franco, in the 1500s, described surgical procedures for strangulated Hernia. Hernia repair proceeded to the next stage after the invention of anaesthetic in 1846 and the introduction of asepsis by Lister in 1865. Various hernia repair procedures exploded from the early to mid-twentieth century, with prosthetic mesh replacing tissue-based repairs. Ger documented the first laparoscopic hernia repair attempt in 1982.[1,2] Our understanding of the nature and treatment of hernias has evolved since then, with multiple treatment options currently available at the dispense of clinicians.

There are many types of hernias, but most of them occur in the abdomen or groin. Direct inguinal, indirect inguinal, and femoral hernias are the three forms of groin hernias based on their placement relative to the inguinal (Hesselbach) triangle. A groin hernia is characterized by a

protrusion in the groin that grows larger over time. An inguinal hernia affects 27% of men and 3% of women over the course of their lives, and the risk increases with age. Most people who have groin hernias experience discomfort or a general feeling of unease, but up to a third are asymptomatic. Globally, more than 20 million inguinal hernia repairs are performed each year.[3,4] Laparoscopic and open–surgery techniques have their advantages and pitfalls. With various patient factors, and surgeon factors influencing the outcome, it becomes imperative to assess the outcome of these therapeutic approaches. Therefore, this study intended to carefully evaluate and compare the outcome in terms of operative duration, post-operative pain, post-operative analgesic requirement, and post-operative complications between laparoscopic inguinal hernia repair and open incisional inguinal hernia repair surgery.

METHODS

This prospective comparative study was conducted in the department of general surgery at the Government Medical College, Ramanathapuram from July 2021 to December 2021. The study consisted of 50 patients, of which 25 were in the open surgery group and 25 were in the laparoscopic group.

Inclusion criteria

Patients above 18 and those who had an inguinal hernia as their primary diagnosis and underwent laparoscopic or open hernia treatment were eligible to participate. Both elective and non-elective cases were included.

Exclusion criteria

The patient was excluded from the study if any concomitant secondary or tertiary surgery was performed along with the inguinal surgery procedure.

Along with demographics of age and gender, the subtype of inguinal hernia indirect, direct, or both, and the laterality were recorded.

All open procedures were conducted under local/epidural/spinal/general anaesthesia, while all laparoscopic procedures were performed under general anaesthesia. In addition, the post-operative outcomes of pain using the visual analogue scale (VAS) immediately, 6 hours, 12 hours, and 24 hours, analgesic requirement, and presence or absence of post-operative complications were recorded.

The operative data and post-operative outcomes of all patients were recorded and statistically analyzed by statistical package for the social sciences (SPSS) software. Descriptive statistics were calculated, and outcomes were compared using student's t-test. A p value ≤ 0.05 was considered significant.

RESULTS

The study consisted of 50 patients, of which 25 were in the open surgery, while the other 25 were in the laparoscopic group. The open surgery group had patients with a mean age of 43.12±12.51 years, with 23 males and 2 females. The laparoscopic group consisted of patients with a mean age of 44.67±18.22 years, with 22 males and 03 females. Forty-five of the cases presented with unilateral hernia, of which 28 showed right laterality and 17 displayed left laterality. In 05 cases, bilateral representation was noted. Sixteen cases were of direct type, 31 of indirect type, and 03 of direct/indirect type (Table 1). No statistical correlation was noted with the age, gender, laterality, type and surgical procedure employed.

The average duration of open inguinal hernia repair was 54.23±9.41 minutes, while laparoscopic took 68.94±12.35 minutes, which was statistically significant ($p<0.0001$). The post-operative pain in VAS just after and post 6, 12, and 24 hours were significantly lower with laparoscopic surgery. Subsequently, the post-operative analgesic requirement was less than the laparoscopic method with only 01 patient requiring analgesic. Seroma was the most commonly noted post-operative complication, especially in laparoscopic cases. Operative and post-operative outcomes are tabulated in Table 2.

Table 1: Comparison of patient characteristics.

Patient characteristics	Open	Laparoscopic	P value
Age (years)	43.12±12.51	44.67±18.22	0.727
Gender			
Male	23	22	0.637
Female	2	3	
Laterality			
Right	15	13	0.818
Left	8	9	
Bilateral	2	3	
Types			
Direct	7	9	0.735
Indirect	16	15	
Direct/indirect	2	1	

Table 2 Comparison of study outcome.

Outcome	Open	Laparoscopic	P value
Duration of procedure (mins)	54.23±9.41	68.94±12.35	<0.0001
Post-op VAS (hours)			
0	2.27±1.68	1.51±0.87	0.05
6	4.83±2.11	3.09±0.99	<0.0001
12	5.35±1.61	3.85±1.43	0.001
24	5.91±2.18	3.91±1.58	<0.0001
Post-op analgesic requirement			
Yes	6	1	0.042
No	19	24	
Post-op complications			
Seroma	1	8	0.01
Testicular atrophy	0	0	n/a
Hematoma	3	1	0.297

DISCUSSION

Although not a novel topic for general surgeons, inguinal herniorrhaphy is still evolving. Many issues surrounding surgery for inguinal hernias remain unresolved, including the indications for correction and surgical approach, risk of complications, and even the disease's aetiology.[2] This study established that laparoscopic herniorrhaphy is superior to the open incision method in post-operative pain. The post-operative pain and subsequent need for analgesics were significantly lesser with the laparoscopic method. However, the duration of surgery and post-operative complication of seroma was significantly higher with laparoscopic surgery.

Pain is one of the most prevalent long- and short-term side effects of inguinal hernia repair. This is especially concerning because many patients arriving for hernia treatment have little or no pain from their hernia at the outset.[2]

A meta-analysis and trial sequential analysis investigated 12 randomized controlled trials involving 3966 patients randomized to Lichtenstein open repair (n=1926) or laparoscopic repair (n=2040) procedures only to repair primary inguinal hernia. The results of this analysis are in line with the present study, where a reduced rate of acute pain was noted in laparoscopic methodology compared to open repair.[5]

The results are also in lieu of another prospective, blinded, randomized study of 62 male patients with a mean (±SD) age of 51±14 years comparing post-operative pain after laparoscopic hernia repair with conventional open hernia repair. McGill pain score (MPS) and McGill VAS were the scales employed. On the first post-operative day, the open group reported 35% more pain by MPS and 44% more pain by the VAS score and 18% more required analgesic tablets. On day 2, open repair patients had 38% more pain by MPS and 73% more by VAS, and 73% more required analgesic tablets. The study concluded that laparoscopic hernia repair was associated with significantly less pain postoperatively.[6]

EU hernia trialists collaboration did a systematic review of thirty-four randomized controlled trials involving 6804 participants, which compared laparoscopic with open methods of groin hernia repair. Duration of operation and post-operative pain were significantly longer in the laparoscopic groups; Although both procedures had few surgical consequences, the laparoscopic group had higher visceral and vascular damage.[7]

Similar results were also noted by Choudhary et al who conducted a prospective comparative observational study of 100 patients of different types of inguinal hernia who underwent either laparoscopic or open type of hernia repair. A visual analogue scale was used to assess pain. The observers noted. There was no statistical difference between the mean ages of the groups. There was a statistically significant observation in the mean operative time in the laparoscopic group (105.38±35.13 minutes) with the open group (79.95±31.12 minutes). Also, the mean pain score of the laparoscopic group was significantly lesser. No, statistically significance was noted in the post-operative complication rate.[8]

This study found concurrence in results with Dhawan, who compared laparoscopic and open herniorrhaphy in 60 patients diagnosed with inguinal hernia. The mean operative time for laparoscopic repair was 132.67±58.98 minutes, while 85.00±31.79 minutes in the open mesh repair method. When post-operative pain was evaluated at 12 hours, 24 hours, 48 hours and 7 days postoperatively, the pain was significantly lower in the laparoscopic technique. The mean analgesic tablet administered was 5.27±1.72 in open mesh repair compared to 3.53±1.93 in laparoscopic repair, which was also significant.[9]

The similarity in results was also noted in the study by Nayak et al who compared laparoscopic hernia surgery with open Lichtenstein's repair. For Lichtenstein's repair, the mean duration of surgery was 62.2 minutes, whereas it

was 72.4 minutes for laparoscopic herniorrhaphy. The difference was statistically significant. Post-operative pain was longer for open repair (2.8 days) than 1.48 days in other groups, which was also significant.[10]

A randomized comparative prospective study conducted at a tertiary care teaching hospital evaluated 60 patients for various parameters. 30 patients (age mean=46.73 years) underwent open inguinal hernia repair, while the rest 30 patients (age mean=42.10 years) had a laparoscopic inguinal hernia repair. No significant variance in pain score between both the groups was observed on a post-operative day, while on the 3rd and 7th-day a significant difference in pain score was noted. The pain score was less in the laparoscopic group.[11]

A randomized multicenter trial compared 2164 patients compared the Lichtenstein open procedure and the laparoscopic procedure, primarily to analyze the recurrence outcomes. They also assessed pain and complications post-surgery. The study observed that patients who underwent open-incisional repair had significantly higher pain levels during the two-week post-operative period at rest, work, during exercise, and performing normal activities compared to the laparoscopic group assessment period. The laparoscopic intervention cluster also had less on the day of surgery and resumed daily activities one day prior. They also note that 9% of laparoscopic patients experienced seroma or hematoma compared to 3% of open surgery patients. Similar outcomes were observed in the present study also.[12]

Contradictory results were noted in the study by Ilyas and Cholleti, who analyzed and compared post-operative pain, surgical site infections, hospital stay and time taken to return to work in laparoscopic and open inguinal hernia repair. The randomized study had 25 patients of either sex in each group in the age group of 15-65 years. Post-operative pain was compared after 1 hour, 6 hours, 12 hours and 24 hours laparoscopic had less pain. Although the results were not statistically significant, the laparoscopic repair group had less pain and required less post-operative analgesic. Post-operative complication seroma was common in the open mesh repair group. There was no statistically significant difference between the duration of operation, with laparoscopic repair taking an average of 95.24 minutes while open mesh repair taking 91.20 minutes.[13] Fllipi et al also noted reduced pain in the laparoscopic group, although it was not significant.[14]

A multicenter randomized controlled trial conducted between May 1999 and December 2006 grouped 206 patients from 10 hospitals equally into laparoscopic or open mesh repair. The researchers evaluated various parameters between the groups. The overall perioperative complication rate for laparoscopic repair was substantially higher than for open repair. The laparoscopic group had greater post-operative complications; nevertheless, the difference in post-operative complications was insignificant. There were no significant differences in pain scores before and after surgery.[15]

Laparoscopic hernia repair is currently used in patients with bilateral or recurring hernias and individuals with unilateral hernias who require surgery. In addition, it is ideal for patients who are desirous of limited post-operative inactivity. The technique's added advantage is its capacity to identify and simultaneously correct a contralateral defect with only a slight increase in surgery time.

Limitations

Parameters like a return to work, chronic pain, and long-term post-operative complication were not assessed. These parameters could have contributed further to our understanding of the study objective.

CONCLUSION

One of the most common surgeries in general surgery is inguinal hernia repair. Many breakthroughs in herniorrhaphy techniques operation have occurred over time, including the development of laparoscopic procedures. With so many surgical options available, deciding on the optimal repair form can be tough. Several variables assist in determining the appropriate operating procedure for a patient with an inguinal hernia. With this study, we established that laparoscopic herniorrhaphy causes less discomfort than open herniorrhaphy and hence can be the preferred method in patients wishing for less post-operative distress.

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