

## COMPARISON OF OUTCOMES (EARLY AND LATE) FOLLOWING OPEN AND LAPAROSCOPIC REPAIR OF INGUINAL HERNIAS: AN EXPERIENCE OF A SINGLE SURGICAL UNIT

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### ABSTRACT

**Background:** Traditionally, repair of an inguinal hernia has been by an open method, but laparoscopic techniques have recently been introduced and are increasing in popularity. This study aimed to compare early and late outcomes following laparoscopic and open repair of inguinal hernia.

**Methods:** After institutional review board approval, a retrospective review was performed with the charts of 97 patients who had undergone surgical repair of inguinal hernias from January 2007 through August 2010, and the data for 73 patients who met the inclusion criteria were analyzed. Surgical variables and clinical outcomes were compared using Student's t test, the Mann-Whitney U test, chi-square, and Fisher's exact test as appropriate. Early-outcome criteria studied include in-hospital mortality, length of hospital stay, complications (infection, bleeding, injury to an organ, and urinary retention), and readmission. Late outcome was assessed by the need for a further inguinal hernia repair.

**Results:** Out of 73 patients 45 patients had undergone open mesh repair and 28 patients had undergone laparoscopic mesh repair for inguinal hernias. Postoperative complications were experienced by 20 patients in the open group and 6 patients in laparoscopic group. In the laparoscopic group, 18 patients underwent total extra peritoneal (TEP) repair, and 10 patients had trans abdominal pre peritoneal (TAPP) repair. Postoperative complications were experienced by 4 patients in the TEP group and 2 patients in the TAPP group ( $p = 0.44$ ). Reoperation rates were higher following laparoscopic repair for primary inguinal hernias as compared to recurrent inguinal hernias.

**Conclusions:** This retrospective review showed that following laparoscopic inguinal hernia repair, reoperation rates are higher than with open surgery following repair of primary unilateral or bilateral hernia but not recurrent inguinal hernia. Both procedures were comparable in terms of intra- and postoperative complications.

**KEYWORDS:** NICE Guidelines for Treatment of Hernias, Surgical Repair of Inguinal Hernias

### INTRODUCTION

Open repair has been the standard surgical approach for the treatment of inguinal hernia. Use of mesh with the open technique reduces recurrence between 50 and 75 %. In the past 20 years laparoscopic techniques have been

introduced for the treatment of hernias that include Trans-Abdominal Pre Peritoneal method (TAPP), and Total Extra-Peritoneal approach (TEP) [1, 2]. According to the NICE guidelines for treatment of hernias, 2004, Laparoscopic surgery should be offered as one of the treatment options for inguinal hernias [3]. Several studies have showed that recurrence rates are higher for laparoscopic procedures as compared to open method. However, results are statistically insignificant for many of these studies [3] and further studies are needed to reach a definitive conclusion regarding the advantage of laparoscopic methods over open procedures. This retrospective study aimed to compare early and late outcomes following laparoscopic and open repair of inguinal hernia.

## MATERIALS AND METHODS

All patients who had undergone surgical repair of inguinal hernias from January 2007 through August 2010 were selected. A total of 73 patients were found, of which open mesh repair was performed in 45 cases and laparoscopic mesh procedure in 28 cases. Of these 28 laparoscopically performed cases, TAPP was done in 10 cases and TEP in 18 cases. Early and late outcomes of these surgeries were identified and compared. Early-outcome criteria assessed were in-hospital mortality, length of hospital stay, complications, and readmission. Late outcome involved recurrence of the hernia. A readmission was defined as any patient readmitted within 30 days of discharge with bleeding or infection, or if a patient was readmitted with urinary retention within 2 days of discharge. Surgical variables and clinical outcomes were compared using Student's t test, the Mann-Whitney U test, chi-square, and Fisher's exact test as appropriate.

## RESULTS

Between January 2007 and August 2010, a total of 73 patients underwent inguinal hernia surgery, of which 28 underwent laparoscopic procedures and 45 underwent open surgery. On an average, patients who underwent laparoscopic surgery were 4 years younger than those who underwent open surgery.

### Early Outcome

Bleeding or hematoma was recorded as a complication in 8 cases, infection in 8 cases and urinary retention in 5 cases. The rates of bleeding and infection, though lower with laparoscopic procedures, were insignificant as compared to open repair. The overall duration of hospital stay was 1 day. However, the mean duration of stay for bilateral hernias was significantly lower with laparoscopic procedures than with open repair (IQR 0-2 as compared to 1-2 for open repair). The rates of readmission were lower with laparoscopic procedures, but this difference was statistically insignificant. (Table 1)

**Table 1: Early Outcomes of Laparoscopic and Open Hernia Repair Procedures**

	Laparoscopic	Open	p-Value
Total no. of patients	28	45	
Age (median (IQR) (years)	56 (44-66)	60 (46-71)	<0.001
Length of stay (median (IQR) (days)	1 (0-1)	1 (0-2)	0.023
Length of stay, Unilateral (days)	0 (0-1)	0 (0-1)	0.026
Length of stay, Bilateral (days)	1 (0-2)	2 (1-2)	0.0001
Readmission	1 (3.57)	4 (8.88)	0.381
Infection	2 (7.14)	6 (13.33)	0.410
Bleeding	1 (3.57)	7 (15.55)	0.111
Urinary retention	2 (7.14)	3 (6.67)	

**Late Outcome**

The overall rates of reoperation were significantly higher with laparoscopic procedures (21.4%) than with open repair (8.8%). This difference was less marked after unilateral hernia repair (5.8% vs. 3.1%) compared to bilateral primary inguinal hernia repair (57.1 vs. 10%) (Table 2)

**Table 2: Reoperation Following Repair in Inguinal Hernia**

	No. of Operations	Number of Reoperations	p-Value
<b>Primary Inguinal Hernia Repair</b>			
<b>Unilateral and Bilateral</b>			
Laparoscopic	24	5	0.041
Open	42	2	
<b>Unilateral</b>			
Laparoscopic	17	1	0.642
Open	32	1	
<b>Bilateral</b>			
Laparoscopic	7	4	0.035
Open	10	1	

Patients who had surgery for recurrent inguinal hernia repair were more likely to undergo surgery for another recurrence (42.8%) as compared to patients who had surgery for primary inguinal hernias (10.6%). The rates of reoperation for recurrent inguinal hernias were lower with laparoscopic procedures (25%) than with open repair (66.7%). (Table 3)

**Table 3: Reoperation Rates Following Recurrent Inguinal Hernia Repair**

	No of Operations	No. of Reoperations	p Value
<b>Recurrent Inguinal Hernia Repair</b>			
<b>Unilateral and Bilateral</b>			
Laparoscopic	4	1	0.271
Open	3	2	
<b>Unilateral</b>			
Laparoscopic	2	1	0.709
Open	3	2	
<b>Bilateral</b>			
Laparoscopic	2	0	
Open	0	0	

Statistical analysis showed that following laparoscopic repair of inguinal hernia, age and bilateral hernia were strongly associated with reoperation (Table 4); while a recurrent hernia and infection were strongly associated with reoperation in cases where open repair of inguinal hernia was performed (Table 5).

**Table 4: Causes of Recurrence in Laparoscopic Repair**

	No Reoperation (n=22)	Reoperation (n=6)	p-Value
Age	53 (43-62)	58 (50-66)	<0.001
Bilateral hernia	5	4	0.041

**Table 5: Causes of Recurrence in Open Repair**

	No Reoperation (n=41)	Reoperation (n=4)	p-Value
Infection	2	4	<0.001
Bilateral	9	1	0.888
Recurrent	1	2	0.0001

## DISCUSSIONS

This is a non-randomized retrospective study. Patients were divided into the two groups based on a combination of patient's preference and the surgeon's discretion. Thus there can be differences between the patient groups being compared. For example, more complex hernias will be operated using an open technique and that the laparoscopic approach will be used preferentially for less technically demanding hernias. This would definitely induce a treatment bias to the results.

Increased infection and hematomas rates were seen following open versus laparoscopic repair, a difference which is consistent with other published studies. [4, 5, 6] Urinary retention rates have been shown to be higher following laparoscopic repair. There was no recordable organ injury during the use of laparoscopy. There was no overall difference observed in length of postoperative stay following laparoscopic and open unilateral hernia repair, but discharge was quicker following bilateral hernia repair. This study was not able to assess other suggested advantages of laparoscopic repair of hernia, such as early return to work [7-10] and reduced incidence of postoperative pain symptoms [7, 11, 12], which are considered by many to be the main reasons for favoring a laparoscopic approach. Thus, in terms of early outcome, as assessed by this study, laparoscopic and open inguinal hernia repair would seem to be broadly comparable.

Late outcome following inguinal hernia repair was assessed by the reoperation rate. Following laparoscopic inguinal hernia repair, reoperation rates are higher than with open surgery following repair of primary unilateral or bilateral hernia but not recurrent inguinal hernia [13]. It suggests the need for reappraisal of the role of open surgery in the treatment of recurrent inguinal hernia [3].

We have shown that a number of factors increase the risk of reoperation. There are differences in mechanism leading to recurrence for open and laparoscopic repair. Postoperative infection increases the chance of recurrence following open repair but not after laparoscopic repair. This may be because infection following laparoscopic repair, which is less common anyway, usually occurs at the port site which is far from the mesh. Reoperation is more likely in older patients following laparoscopic repair.

## CONCLUSIONS

This study demonstrates that reoperation rates are higher following laparoscopic repair of primary inguinal hernia, including both unilateral and bilateral hernias, but not following surgery for recurrent inguinal hernia.

In terms of early outcome, as assessed by this study laparoscopic and open inguinal hernia repair would seem to be broadly comparable.

There are differences in mechanism leading to recurrences in open and laparoscopic techniques. Postoperative infection increases the chance of recurrence following open repair but not after laparoscopic repair.

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