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EVALUATION AND COMPARISION OF EFFECTIVENESS BETWEEN LAPAROSCOPIC AND OPEN VENTRAL HERNIA REPAIR IN TERMS OF RECURRENCE RATE, HOSPITALISATION, SURGICAL OUTCOMES, PERIOPERATIVE COMPLICATIONS, NAUSEA, AND POSTOPERATIVE DISCOMFORT

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ABSTRACT

Background: Incisional hernias are among the most frequent surgical problems that arise after laparotomies. Approximately thirty percent of patients who have a laparotomy get incisional hernias that need to be repaired.

Aim: To evaluate and compare the effectiveness of laparoscopic and open ventral hernia repair in terms of recurrence rate, hospitalisation, surgical outcomes, perioperative complications, nausea, and postoperative discomfort.

Methods: Two groups of fifty-two participants each were created from the 104 subjects, and each group had either open mesh repair or laparoscopic hernia repair. Patients with primary or recurrent incisional hernias measuring more than 3 cm and less than 15 cm were included in the study. They received treatment and had their postoperative pain, recurrence rate, hospital admission, postoperative and perioperative complications, morbidity, mortality, operative outcomes, and nausea measured.

Results: In contrast to the laparoscopic repair group II, which required wound drainage in just 3.84% of cases, the open hernia repair group I required wound drainage in 44.23% of its individuals (n = 23). With $p<0.001$, this difference was statistically significant. Group I, open drainage, had a much larger blood loss (50.3 ml) than the 10.2 ml mean blood loss ($p=0.05$) that was reported. Comparing the laparoscopic repair group to the open hernia repair group, more problems were seen.

Conclusions: Laparoscopic hernia repair required decreased blood loss and wound drainage. However, compared to open repair, laparoscopy had longer operating times and more perioperative problems. Regardless of the magnitude of the defect, both groups have a comparable recurrence rate.

Keywords: Hernia, Hernia repair, Incisional hernia, laparoscopy, open hernia repair

INTRODUCTION

An incisional hernia is one of the most common post-laparotomy problems that are documented. It has been shown that incisional hernias occur in around 30% of patients undergoing laparotomy procedures. Incisional hernias are linked to pain, discomfort, breathing difficulties, and/or undesirable cosmetic results.1 The following hernia repair is frequently caused by the morbidity related to the incisional hernia. Recurrence rates after incisional hernia repair remain high, ranging from 32% to 63%, despite advances and breakthroughs in prosthetic material utilisation and surgical procedures.2.

Hernia recurrence is linked to a number of risk factors, one of which is the size of the hernia, which is unavoidable. The hunt for less intrusive and more successful hernia repair methods intensifies as medical technology progresses. The 1990s saw the advent of less invasive surgery, which made laparoscopy a viable option for incisional hernia repair.3. When treating an incisional hernia, laparoscopy is a safer, more effective, and less painful treatment.

Laparoscopy is the gold standard of care for cholecystectomy and has proven to be similarly beneficial for a number of other operations as well. With its broad use in many surgical specialties, laparoscopic repair of incisional hernias

has recently shown itself to be a well recognised and utilised surgical technique.4,5 According to statistics from current research, laparoscopic surgery is much superior than open hernia repair in the short run concerning the lesser amount of blood loss, shorter duration of hospital stay, and lesser perioperative complications.[6]

The rates of recurrence and other long-term clinical outcomes following laparoscopic hernia surgery are yet unclear. There is little information in the literature about the benefits and drawbacks of laparoscopic incisional hernia repair. This highlights the need for more research comparing laparoscopic vs open traditional hernia repair in a broad population.7,8

The goal of the current study was to evaluate the effectiveness of laparoscopic vs open ventral hernia repair in terms of recurrence rate, hospital admission, perioperative and postoperative complications, surgical outcomes, nausea, and discomfort following surgery.

MATERIALS AND METHODS

The goal of the current clinical study was to evaluate the effectiveness of laparoscopic and open ventral hernia repair in terms of recurrence rate, hospital admission, perioperative and postoperative problems, surgical outcomes, nausea and pain following surgery.

Subjects from the Institute's Department of General Surgery made up the study population. All study participants gave their informed permission in writing and verbally after being fully told about the study's design. The study's inclusion criteria included subjects with hernias measuring between 3 and 15 cm in size, those who were willing to participate, those who were at least 18 years old, those who were indicated for elective repair, and those that were located at least 5 cm away from the inguinal area and costae on the ventral abdominal wall. Subjects lacking informed permission, a history of open abdominal surgery, an absolute contraindication to general anaesthesia, and a pneumoperitoneum contraindication were all grounds for exclusion from the research.

Following each subject's final participation in the research, a thorough history was taken and a clinical examination was conducted. 104 individuals, ranging in age from 18 to 68, were involved in the study, representing both genders.

The 104 patients were subsequently split into two groups of 52 randomly selected patients each. Group I patients had open conventional management for their incisional hernia, whereas Group II patients underwent laparoscopic management. Hernia surgery was performed laparoscopically using abdominal trocars (3 to 5; one was 10 mm and two to four were 5 mm). In order to produce the pneumoperitoneum and to inflate using carbon dioxide to achieve an intraabdominal pressure of 15 mmHg, a blunt tip trocar was used.

A laparoscope was then introduced to visualize the abdominal wall from the inner surface. The other side of the hernia was also fitted with 5mm trocars, and the hernia's port size was measured after that. Diathermy was used to perform extensive adhesiolysis if necessary. To access the hernia defect, the omentum and bowel were separated from the abdominal wall. The mesh was inserted into the abdominal cavity via the trocar. The mesh was positioned over the defect and secured with nonabsorbable tackers before being sutured. Depending on the location and extent of the hernia, an incision was created in the previous scar to facilitate an open repair of the incisional hernia. The hernia sac was exposed and identified by separating the subcutaneous layers and scar tissue from the abdominal wall. The hernia port's dimensions were then measured.

If possible, the hernia sac was cut beneath the rectus muscle. There was no hernia sac resection or opening. The mesh was positioned over the defect and fastened to the rectus muscle after the peritoneum was closed. The suturing was completed last. Following surgery, both groups' subjects—those in which extubation was not performed—were admitted to the critical care unit for monitoring and ventilator support. Following surgery, all participants in both groups received intravenous analgesics or, if practical, non-steroidal anti-inflammatory medications. After being allowed to mobilise on their own, the individuals were released from the hospital.

Postoperative pain was the main outcome measured in the research participants. Recurrence rate, hospital admission, perioperative and postoperative complications, morbidity, mortality, surgical outcomes, and nausea were the secondary outcomes. The subjects were called at follow-up on 1 week, 6 weeks, 1 year, and 5 years following discharge.

The data collected were analyzed statistically using the SPSS (Statistical Package for Social Science) software version 22.0; Chicago, IL, USA, and ANOVA, Mann-Whitney test, chi-square, and t-test. The significance level was considered at the p-value of >0.05.

RESULTS

The current clinical investigation compared the effectiveness of laparoscopic and open ventral hernia repair in terms of recurrence rate, hospital stay, perioperative and postoperative problems, surgical outcome, nausea, and discomfort following surgery. 104 individuals, ranging in age from 18 to 68, were involved in the study, representing both genders. The 104 patients were subsequently split into two groups of 52 randomly selected patients each. Group I patients had open conventional management for their incisional hernia, whereas Group II patients underwent

laparoscopic management. Group I's research participants were 56.5±12.6 years old, whereas Group II's study subjects were 59.3±12.6 years old on average.

In Group I, there were 59.61% (n=31) men and 61.53% (n=32) males; in Group II, there were 38.46% (n=20) females and 40.38% (n=21) females. For Group I and II, the BMIs were 29.1±4.8 kg/m2 and 28.1±4.9 kg/m2, respectively. For Group I and II, the average hernia size was 5.2 and 5.1 cm, respectively. 84.61% (n=44) and 78.84% (n=41) of the individuals in Groups I and II, respectively, had the main type of hernia, whereas 15.38% (n=8) and 21.15% (n=11) of the participants in Groups I and II, respectively, had the recurrent kind. According to Table 1, the most prevalent ASA type was type II in 51.92% (n=27) of Group I individuals and 61.53% (n=32) of Group II subjects, respectively.

With respect to mean age, age range, gender, BMI, hernia type, and hernia size, the two groups' p-values were 0.82, 0.88, 0.96, 0.83, 0.29, and 0.46, respectively (Table 1). All of these findings were statistically non-significant. When the perioperative results from the two study subject groups were compared, it was found that the individuals who underwent open hernia surgery had a longer hospital stay—3.2 days—than the subjects who underwent laparoscopic hernia repair—3.1 days. P = 0.52 indicated that there was no statistically significant difference between the two groups. In contrast to the laparoscopic repair group II, which required wound drainage in just 3.84% of cases, the open hernia repair group I required wound drainage in 44.23% of its individuals (n = 23). With p<0.001, this difference was statistically significant.

In group I, open drainage, there was a notable increase in blood loss, with 50.3 ml of blood loss seen, compared to a mean blood loss of 10.2 ml recorded with p=0.05. In Group I, an open hernia repair, the surgical time was 76.2±33.4 minutes, whereas in Group II, a laparoscopic repair, the operative time was 100.4±49.2 minutes. This difference in operative times was substantial. According to Table 2, this difference was statistically significant at p=0.01. Concerning the issues in the two study participant groups, it was noted that 1.92% (n=1) of group II and none of the individuals in group I underwent laparoscopic repair and had a urinary bladder perforation. 9.61% (n=5) of group II patients and 1.92% (n=1) of group I subjects had an enterotomy. There was no patient from group I and 1.92% (n=1) of group II participants who had laparoscopic repair had serosal bowel damage. In group I, there were 1.92% (n=1) and group II, 3.84% (n=2) of participants who experienced further surgical problems. Between the two groups, the incidence of surgical injuries was statistically non-significant (p=047).

Hematomas were the most common postoperative complication, occurring in 21.15% (n=11) of Group I and 17.30% (n=9) of Group II subjects. Wound infections occurred in 9.61% (n=5) and 7.69% (n=4) of Group I and II subjects, respectively, and seromas in 7.69% (n=4) of Group I and 13.46% (n=7) of Group II subjects, severe pain occurred in 21.15% (n=11) of Group II subjects, airway infections in 5.76% (n=3) of Group I and II subjects, and urinary tract infections occurred in 1.92% (n=1) of Group I and 7.69% (n=4) of Group II subjects. Postoperative haemorrhage and relaparotomy were observed in 1.92% (n=1) of Group I individuals and 3.84% (n=2) of Group II subjects. In 3.84% (n=2) of Group II individuals, ileus was seen.

Phlebitis, facial dehiscence, and wound dehiscence were seen in 3.84% (n=2), 1.92% (n=1), and 5.76% (n=3) subjects of Group I and no subject of Group II. In Group II participants, there were 3.84% (m=2) and 7.69% (n=4) other postoperative problems. Table 3 indicates that the difference in postoperative complications between the two groups was statistically non-significant (p=0.15). Regarding the follow-up parameters, Group I's mean follow-up time for open hernia repair was 36.3±33.3 months, which was more than Group II's mean follow-up time of 34.4±33.3 months for laparoscopic surgery. Nevertheless, at p=0.42, this difference was statistically not significant. According to Table 4, the recurrence rate was likewise statistically not significant, with 12 in the Group I (open repair) group and 14 in the Group II (laparoscopic repair) group (p=0.32).

DISCUSSION

Group I's research participants were 56.5±12.6 years old, whereas Group II's study subjects were 59.3±12.6 years old on average. In Group I, there were 59.61% (n=31) men and 61.53% (n=32) males; in Group II, there were 38.46% (n=20) females and 40.38% (n=21) females. For Group I and II, the BMIs were 29.1±4.8 kg/m2 and 28.1±4.9 kg/m2, respectively. For Group I and II, the average hernia size was 5.2 and 5.1 cm, respectively. 84.61% (n=44) and 78.84% (n=41) of the individuals in Groups I and II, respectively, had the main type of hernia, whereas 15.38% (n=8) and 21.15% (n=11) of the participants in Groups I and II, respectively, had the recurrent kind. 1.

With respect to mean age, age range, gender, BMI, hernia type, and hernia size, the two groups' p-values were 0.82, 0.88, 0.96, 0.83, 0.29, and 0.46, respectively. These results were statistically non-significant. These demographics were similar to those evaluated by the authors of Bhatt MF10 in 2007 and Shell IV DH et al9 in 2008, two earlier investigations in which respondents had similar demographics to those of the current research. According to the perioperative results for the two research subject groups, the duration of hospital stay for patients undergoing open hernia surgery was 3.2 days, whereas the duration for that undergoing laparoscopic hernia repair was 3.1 days. P = 0.52 indicated that there was no statistically significant difference between the two groups.

In contrast to the laparoscopic repair group II, which required wound drainage in just 3.84% of cases, the open hernia repair group I required wound drainage in 44.23% of its individuals (n = 23). With p<0.001, this difference was

statistically significant. Group I, open drainage, had a much larger blood loss (50.3 ml) than the 10.2 ml mean blood loss (p=0.05) that was reported. In Group I, an open hernia repair, the surgical time was 76.2±33.4 minutes, whereas in Group II, a laparoscopic repair, the operative time was 100.4±49.2 minutes. This difference in operative times was statistically significant. With p=0.01, this difference was statistically significant. These findings aligned with the research conducted by Mehta K. D12 in 2020 and Rulaniya S11 in 2018 Its authors found superior results between the open hernia repair group and the laparoscopic group.

After evaluating the problems in the two study participant groups, it was discovered that none of the individuals in group I and 1.92% (n=1) of the subjects in group II who had laparoscopic repair had urinary bladder perforations. In 1.92% (n=1) of group I participants and 9.61% (n=5) of group II subjects, enterotomy was seen. Between the two groups, the incidence of operational injuries was statistically not significant (p=047). Hemostasis was the most frequent postoperative event, occurring in 21.15% (n=11) of Group I patients and 17.30% (n=9) of Group II subjects. Wound infection was the next most common problem, occurring in 9.61% (n=5) and 7.69% (n=4) of Group I and II individuals, respectively seroma in 7.69% (n=4) subjects of Group I and 13.46% (n=7) subjects of Group II, severe pain in 21.15% (n=11) subjects of group II, airway infection in 5.76% (n=3) subjects of Group I and II each, and UTIs in 1.92% (n=1) subject of group I and 7.69% (n=4) subjects of Group II. These results corroborated research by Barbaros U et al. (2007) and Navarra G et al. (2007), which revealed that laparoscopic repair was associated with a higher risk of complications than open hernia surgery. Regarding the follow-up parameters, Group I's open hernia repair had a mean follow-up time of 36.3±33.3 months, which was longer than Group II's laparoscopic repair, which had a mean follow-up time of 34.4±33.3 months. Nevertheless, at p=0.42, this difference was statistically not significant. With a p-value of 0.32, the recurrence rate was likewise statistically not significant, with 12 in the Group I (open repair) group and 14 in the Group II (laparoscopic repair) group.

The findings of Misra MC et al. (2016) and Halm JA et al. (2007), who found non-significant recurrence rates in the open and laparoscopic hernia repair group, were consistent with these results.

CONCLUSION

Taking into account its limitations, the current study finds that laparoscopic hernia repair requires reduced blood loss and wound drainage. However, compared to open repair, laparoscopy had longer operating times and more perioperative problems. Regardless of the magnitude of the defect, both groups have a comparable recurrence rate. The study's shortcomings were a limited sample size, a brief observation time, and geographic region biases that called for longer-term, longitudinal research.

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TABLES

Characteristics	**Open repair n=52 (%)**	**Laparoscopic repair n=52 (%)**	**p-value**
Mean age (years)	56.5±12.6	59.3±12.6	0.82
Age range (years)	18-62	19-68	0.88
Gender			
Males	31 (59.61)	32 (61.53)	0.96
Females	21 (40.38)	20 (38.46)	
BMI (kg/m2)	29.1±4.8	28.1±4.9	0.83
Hernia type			
Primary	44 (84.61)	41 (78.84)	0.29
Recurrent	8 (15.38)	11 (21.15)	
Hernia size (cm)	5.2 (4-10)	5.1 (4-8)	0.46
ASA type			
I	14 (26.92)	13 (25)	
II	27 (51.92)	32 (61.53)	
III	10 (19.23)	7 (13.46)	
IV	1 (1.92)	0	

Table 1: Demographic characteristics of the study participants

Parameter	**Open repair n=52 (%)**	**Laparoscopic repair n=52 (%)**	**p-value**
Hospital stay duration (days)	3.2 (2-5)	3.1 (2-4)	0.52
Wound drainage	23 (44.23)	2 (3.84)	**<0.001**
Blood loss (ml)	50.3 (10-100)	10.2 (1-40)	**0.05**
Operative time (mins)	76.2±33.4	100.4±49.2	**0.01**

Table 2: Perioperative outcomes in the two groups of study subjects

Complications	**Open repair n=52 (%)**	**Laparoscopic repair n=52 (%)**	**p-value**
Operative complications			
Perforation of the urinary bladder	0	1 (1.92)	0.47
Enterotomy	1 (1.92)	5 (9.61)	
Serosal bowel injury	0	1 (1.92)	
Others	1 (1.92)	2 (3.84)	
Postoperative complications			
Relaparotomy	1 (1.92)	2 (3.84)	0.15
Postoperative bleeding	1 (1.92)	2 (3.84)	
Ileus	0	2 (3.84)	
Phlebitis	2 (3.84)	0	
Urinary tract infection	1 (1.92)	4 (7.69)	

Airway infection	3 (5.76)	3 (5.76)	
Severe pain	0	11 (21.15)	
Seroma	4 (7.69)	7 (13.46)	
Hematoma	11 (21.15)	9 (17.30)	
Facial dehiscence	1 (1.92)	0	
Wound dehiscence	3 (5.76)	0	
Wound infection	5 (9.61)	4 (7.69)	
Others	2 (3.84)	4 (7.69)	

Table 3: Complications reported in the study subjects

Follow-up	**Open repair n=52 (%)**	**Laparoscopic repair n=52 (%)**	**p-value**
Follow-up (months)	36.3±33.3	34.4±33.3	0.42
Recurrence rate	12	14	0.32

Table 4: Follow-up parameters in the study subjects