

# What is the ideal repair technique for triple hernia accompanied by umbilical and bilateral inguinal hernias?

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## Abstract

**Background:** For patients with bilateral inguinal hernia (BIH) accompanied by an umbilical hernia (UH), there may be hesitations regarding the repair of all three hernias in the same session in terms of pain and possible problems in the healing process. Studies on these patients are rather rare in the literature. In the present study, the results of laparoscopic and open surgical treatment in patients with triple hernia accompanied by BIH and UH were compared.

**Methods:** The data of patients were analyzed retrospectively. Patients whose hernias were fully repaired with open surgery made up group 1, and patients who underwent laparoscopic transabdominal preperitoneal (TAPP) repair together with open UH repair made up group 2. There were 10 patients in group 1 and 11 patients in group 2. The patients' umbilical defect diameter, whether inguinal hernia (IH) was scrotal or not, applied surgical technique, length of hospital stay, duration of the operation, postoperative complications, and recurrence status were evaluated.

**Results:** While 19 (90.5%) of the patients were male, 2 (9.5%) were female. In group 2, recurrence of unilateral IH was seen in 1 (4.5%) patient. Complications developed in 3 (14.3%) patients: seroma in 1 patient in group 1; and seroma in 1 patient; and wound infection in another patient in group 2. There was no significant difference between the groups in terms of duration of the operation, length of hospital stay, or postoperative complications (p value, p=0.251, p=0.756, p=0.538, respectively)

**Conclusion:** In patients with triple hernia where umbilical and BIH occur together, open UH repair and IH repair can be performed safely by TAPP repair.

**Keywords:** Triple Hernia, Umbilical Hernia, Bilateral Inguinal Hernia, Transabdominal Preperitoneal Repair.

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## INTRODUCTION

Inguinal and femoral hernias are referred to as inguinal hernias (IHs), and they are treated surgically. Although there is a lot of experience with IH and many studies have been performed, new scientific studies are needed due to continued recurrence, the excessive variety of hernia repairs, and the definition of modern surgical approaches. It is no longer a matter of discussion whether bilateral inguinal hernia (BIH) repairs can be performed either openly or laparoscopically in the same session (1). Although IHs can be repaired without any problems with the open technique, it is known that the laparoscopic approach provides advantages such as allowing intervention in both inguinal areas through the same incisions, less chronic pain, rapid recovery, and early return to work (2). In patients with BIH accompanied by an umbilical hernia (UH), there may be hesitations regarding the repair of all 3 hernias in the same session in terms of pain and possible problems in the healing process. Studies on these patients are rather rare in the literature. In the present study, the results obtained from laparoscopic and open surgical treatment in patients with triple hernia where BIH was accompanied by UH were compared.

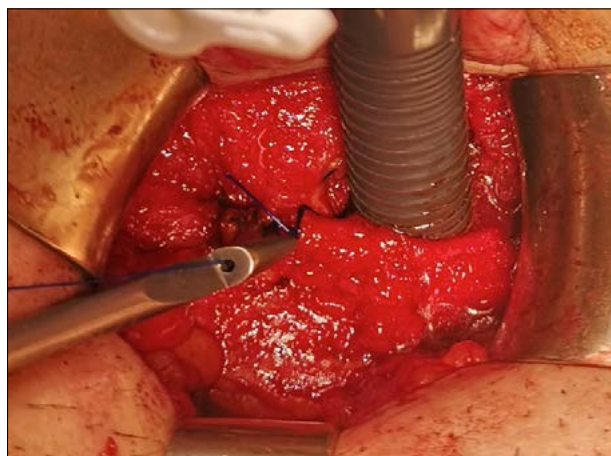
## MATERIALS AND METHODS

Patients with UH and BIH who were operated in Kahramanmaraş Elbistan State Hospital General Surgery Clinic between January 1, 2017 and December 31, 2021 were analyzed retrospectively. Patients whose hernias were fully repaired with open surgery made up group 1, and patients who underwent laparoscopic transabdominal preperitoneal (TAPP) repair together with open umbilical hernia repair made up group 2. Patients under the age of 18 were excluded from the study. There were 10 patients in group 1 and 11 patients in group 2. The patients' sex, age, body mass index (BMI), risk factors for hernia, radiological examinations, umbilical defect diameter, whether inguinal hernia was scrotal or not, existence of primary/recurrent hernia, American Society of Anesthesiologists (ASA) score, surgical technique applied, length of hospital stay, duration of the operation, postoperative complications, and recurrence status were evaluated. Approval for the study was obtained from the Clinical Research Ethics Committee of Kahramanmaraş Sütçü İmam University (date 06.04.2022, decision number 2022/07).

**Surgical technique (Group 1):** Spinal anesthesia was administered to all patients. A transverse incision was

made just above the umbilicus. The fascia defect was then closed with primary sutures. Next, tension-free repair was performed with the darning technique using 2/0 prolene sutures in some patients and with prolene mesh in the others. An oblique incision was made in the inguinal region on one side. Polypropylene mesh approximately 6×12 cm in size was laid on the region and fixed (Lichtenstein technique). The same procedures were applied to the other inguinal region as well.

**Surgical technique (Group 2):** General anesthesia was administered in all of the patients. The surgery was performed in the supine and 10°-15° Trendelenburg position. Following the transverse incision over the umbilicus, a trocar was inserted using Hasson's open technique. The UH sac was opened and the contents of the sac were reduced. After the purse string suture and sliding-type knot were prepared, an 11-mm trocar was placed, the knot was tightened and the trocar was fixed (Figure 1). At the level of the umbilicus, a 5-mm trocar was placed on both the right and left midclavicular lines. On one side, the peritoneum was opened in the inguinal region, dissected, and the hernia sac was completely released. Polypropylene mesh approximately 12×15 cm in size was fixed to the pubis and anterior abdominal wall with 3-4 absorbable automatic mesh fixers. The same procedures were applied to the other inguinal region as well. In all cases, the peritoneum was closed with a mesh stabilizer. After the trocars were removed, the purse string suture in the umbilical defect was knotted. Afterwards, repair was carried out in some patients with 2/0 prolene sutures and in others with polypropylene mesh.



**Figure 1.** Fixation of the trocar inserted through the umbilical defect with a previously prepared purse string suture and sliding knot

**Statistical Analysis:** Categorical variables were presented as frequency (n) and percentage (%), normally distributed continuous variables as mean±standard deviation (SD), and non-normally distributed ones as median (min-max). The relationship between categorical variables was examined with Fisher's exact test. The assumption of normal distribution was checked with the Shapiro–Wilk test. The Mann–Whitney U test was used for non-parametric comparison of continuous variables between the study groups, and the independent t-test was used for parametric comparison. All analyses were performed with IBM SPSS 23.0 (IBM Corp., Armonk, NY, USA). P values less than 0.05 were considered statistically significant.

## RESULTS

Among the 150 cases of BIH, 21 patients with accompanying UH were included in the present study. During the study period, 954 unilateral IH operations were performed. In this period, the rate of BIH repair was 13.6%. The rate of accompanying UH among the BIH was 14%. While 19 (90.5%) of the patients were male, 2 (9.5%) were female. The mean age was 54 (min 27 - max 76). In group 2, unilateral IH recurrence developed in 1 (4.5%) patient. Complications developed in 3 (14.3%) patients: seroma in 1 patient in group 1; seroma in 1 patient, and wound infection in another patient in group 2. There was no significant difference between the two groups in terms of age ( $p=0.061$ ), sex ( $p=0.214$ ), BMI ( $p=0.595$ ), or chronic disease ( $p=0.183$ ) distributions. Two (9.5%) patients in group 2 suffered recurrence. The median umbilical defect diameter was 2 (IQR: 2-2.5) cm in the group that underwent open surgery and 1 (IQR: 1-1.5) cm in the group that underwent surgery by laparoscopy, and the umbilical defect diameter was greater in the open surgery group ( $p=0.002$ ). Darning (100% and 40%, respectively) was used more frequently in the laparoscopically operated patients and grafting (60% and 0%, respectively) in the open surgery patients ( $p=0.004$ ) (Table 1). There was no significant difference between the groups in terms of duration of surgery, length of hospital stay, or postoperative complications (Table 2).

**Table 1. Comparison of demographic characteristics, ASA scores, and imaging methods of patients**

	Group 1 (n=10)	Group 2 (n=11)	p
Age (years), <i>median</i> (IQR)	60,5(44-65)	45(31-55)	0.061
Sex, n(%)			
Female	2(20)	0(0)	0.214
Male	8(80)	11(100)	
BMI (kg/m <sup>2</sup> ), <i>mean±SD</i>	26.2±1.8	25.6±2.8	0.595
Chronic disease, n(%)	5(50)	2(18.2)	0.183
Emergency/Elective, n(%)			
Elective	9(90)	11(100)	0.476
Emergency	1(10)	0(0)	
Recurrent case, n(%)			
First repair	10(100)	9(81.8)	0.476
Recurrence	0(0)	2(18.2)	
Imaging, n(%)			
None	3(30)	6(54.5)	0.250
USG	4(40)	5(45.5)	
CT	3(30)	0(0)	
Umbilical defect diameter (cm), <i>median</i> (IQR)	2(2-2.5)	1(1-1.5)	<b>0.002</b>
Scrotum extension, n(%)	2(20)	2(18.2)	0.999
ASA, n(%)			
1	3(30)	8(72.7)	0.120
2	5(50)	3(27.3)	
3	2(20)	0(0)	
Umbilical technique, n(%)			
Graftless darning	4(40)	11(100)	<b>0.004</b>
Grafted	6(60)	0(0)	

ASA: American Society of Anesthesiologists, BMI: Body mass index, USG: Ultrasonography, CT: Computed tomography

Independent t-test, Mann–Whitney U test, Fisher's exact test. Data are given as median (minimum-maximum), mean±standard deviation, number, and percentage. If  $p<0.05$ , there is a statistically significant difference.

**Table 2. Comparison of the duration of the operation, length of hospital stay, and postoperative complication status of the patients**

Variables	Group 1 (n=10)	Group 2 (n=11)	p
Duration of the operation (min), median (IQR)	87.5(80-95)	85(80-90)	0.251
Length of hospital stay (days), median (IQR)	1(1-2)	1(1-2)	0.756
Complication, n(%)	1(10)	2(18.2)	0.538
Seroma	1(10)	1(9.1)	0.999
Wound infection	0(0)	1(9.1)	0.999
Recurrence, n(%)	0(0)	1(9.1)	0.999

Mann-Whitney U test, Fisher's exact test. Data are given as median (minimum-maximum), number, and percentage. If  $p < 0.05$ , there is a statistically significant difference.

## DISCUSSION

There is no single technique that can be considered standard for all IHs. The characteristics of the patient, anesthesia status, cost, and the surgeon's experience and preference affect the choice of technique. IH can be repaired with laparoscopic and open techniques. Although different methods have been developed in the open technique, the Lichtenstein technique is recommended more frequently due to its proven success and short learning curve. The laparoscopic approach, on the other hand, provides rapid recovery and a low risk of chronic pain despite the long learning curve. Therefore, a laparoscopic approach is recommended for BIH if the necessary surgical conditions are met (3-5). There is limited information in the literature about triple hernias when umbilical IH is accompanied by BIH (6).

In the present study, open and laparoscopic approaches in IH repairs were used at similar rates. Moreover, the hernia size and ASA score were greater in patients who underwent open repair, and spinal anesthesia was administered in all of them. It is thought that deciding to open repair in these patients might stem from concerns regarding both avoidance of general anesthesia complications, and possible surgical difficulty due to hernia size. Patients declining general anesthesia or choosing open surgery

may also be the reasons behind this decision as well. Although triple hernias can be successfully repaired with the open technique, it is more cosmetically satisfactory to operate through three small incisions in the laparoscopic technique. In addition, the absence of contraindications for the laparoscopic approach in many open repair cases led to the opinion that the laparoscopic rates should be higher in future studies.

UH and other surgical pathologies that require intervention in the abdomen can be treated separately in the same session. However, the widespread application of modern endoscopic techniques in surgery enabled other surgical abdominal interventions to be performed simultaneously with UH repair with fewer incisions (7).

It was reported that the operation time is longer in laparoscopic inguinal hernia repairs (8). The instruments used in laparoscopic operations are more elaborate, and instrument preparation may take longer compared to open surgeries. However, the surgical repair times in the present study were similar between the approaches. It is thought that the smaller umbilical defect diameters in patients with laparoscopic IH and the greater monitoring of scrotal hernias in patients who underwent open inguinal repair may have reduced the time difference between the two techniques. In addition, the routine application of laparoscopic inguinal repairs and the completion of the learning curve by the surgeons that carried out the operations within the scope of the present study may have also caused the durations of the applied techniques to be similar (9).

Organ injury within the hernia sac is a potential risk during the insertion of a trocar or Veress needle through the hernia defect. In order to reduce this risk, it was recommended to insert the trocar via Hasson's technique (10). Therefore, in all of the patients in the present study, the trocar inserted in the umbilical region was placed using Hasson's open technique. In addition, after the content of the sac was reduced, a purse string suture was prepared in the fascia defect and a sliding knot was applied. It is thought that this placement of the trocar is highly beneficial in preventing insufflated gas from escaping from the trocar margin and narrowing the surgical field.

In a study conducted by Kamer et al., it was reported that 9.4% recurrence was observed with the primary suture

technique in umbilical defect repair and 5.6% with Mayo repair, while no recurrence was observed in patients who underwent tension-free repair with prolene mesh (10). In Harriott et al.'s study, hernias formed by the trocar site in the umbilical region in laparoscopic IH repairs were examined and it was stated that trocar site hernias occurred 3 times more frequently after triple hernia repairs in UH compared to BIH repairs (11). In the present study, although inguinal hernia recurrence was observed on one side of one patient in group 2, no UH recurrence was observed in either group. Results may vary in studies with more patients. Harriott et al. applied a prolene mesh plug for UH repair in 105 patients. They repaired the fascia by primary suturing the fascia one by one in 71 patients, and there was no difference in recurrence rates between the two groups. However, none of the patients in the present study underwent only primary repair. In group 1, the defect was primarily repaired. In group 2, the previously prepared purse string suture was knotted and the defect was closed. Then tension-free repair with polypropylene mesh was applied to some of the patients in both groups, while the others were repaired with 2/0 prolene suture darning. It is remarkable that there were no recurrences in patients who were repaired with darning.

The limitations of the present study were the small number of patients and its retrospective nature.

In conclusion, TAPP and open UH repair are practical and safe approaches in patients with triple hernia when umbilical and bilateral inguinal hernias occur together. It is known that the application of prolene mesh in hernia repair significantly reduces recurrence rates. However, in cases with a small umbilical hernia defect diameter, non-absorbable suture darning is also a safe option. Nevertheless, studies involving more cases are needed.

### Declarations

The authors received no financial support for the research and/or authorship of this article. There is no conflict of interest.

This study was approved by the Kahramanmaraş Sütçü İmam University Clinical Research Ethics Committee (Date 06.04.2022, Decision Number 2022/07).

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