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Effectiveness of the modified darn repair method in inguinal hernia repair: 10 years of experience

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Abstract

Aim: We aimed to evaluate the effectiveness of the Modified Darn Repair (MDR) method performed in our clinic for Inguinal Hernia Repair (IHR) and to determine the postoperative complications and recurrence rates of this method.

Material and methods: The records of all patients who underwent IHR with MDR method in our clinic between January 2012 and December 2021 were obtained from the hospital database. Demographic characteristics of the patients, intraoperative findings, hospitalization and return to normal activities, postoperative complications and recurrence rates were retrospectively analyzed.

Results: A total of 892 patients aged between 18 and 85 with a male:female ratio of 14:1 were studied. Of 1011 elective IHRs, 773 were unilateral (right/left: 452/321) and 119 (119 right + 119 left) were bilateral. Hernia types were 667 (66%) indirect, 273 (27%) direct, 71(7%) pantaloon (combined) hernias. All procedures were performed under spinal anesthesia. The mean duration of surgery was 35 (15-75) minutes, hospital stay was 1.1 (1-3) days, and return to normal activities was 12.8 (10-20) days. The postoperative complications were wound infection in 33 (3.26%) patients, hematoma in 11 (1.09%) patients, and abscess/seroma in 15 (1.48%) patients. In addition, suture material reaction developed in 1 (0,12%) patient. Recurrence was observed in 25 (2.4%) patients and no mortality was observed in any patient.

Conclusion: The goal of every surgeon is to have a non-recurring repair in IHR without leaving a foreign body in the patient. Despite the criticism, we believe that the MDR technique is a safe, effective and viable option.

Key words: modified darning, inguinal hernia, repair, recurrence rate, postoperative complications

Introduction

Inguinal hernia repair (IHR) is one of the most frequently performed surgical procedures in our clinic, as it is all over the world [1]. Regardless of the hernia type, the definitive treatment of inguinal hernia is surgery [2]. In inguinal hernia repair, many new techniques have been described since the description of the Bassini technique [3]. Inguinal hernia repair, many new techniques have been described since the description of the Bassini technique [3]. All the techniques described are aimed at reducing the recurrence rate. In most of these repair methods, the cause of recurrence is the wear of the inguinal ligament fibers because of a significant amount of tension [4]. In most of these repair methods, the cause of recurrence is the wear of the inguinal ligament fibers due to a significant amount of tension [4]. The Darning technique, first introduced by Abrahamson and popularized by Moloney, has been recognized as a relatively tension-free method of tissue-based repair. They described the inguinal canal as connecting the tissues from the pubic tubercle to the inner ring in a tension-free manner to form a lattice, and narrowing to the inguinal ligament (Poupart's ligament) and the tendon conjugate with monofilament nylon up to the pubic tubercle again [5,6]. After all the techniques used in inguinal hernia repair; postoperative pain, time to return to daily activities, recurrence rates and chronic inguinal pain are the main problems [7].

To evaluate the success of any surgery, IHR is evaluated by criteria such as recurrence rate and

complications such as chronic inguinal pain, cost, and time to return to the normal activities. The search for a method that can achieve all the above objectives, preferably without any foreign objects such as knitting, continues. Studies evaluating the netting technique have shown satisfactory results in terms of recurrence and other postoperative complications. Some of these are comparable to the Lichtenstein inguinal hernia repair technique, which has now become the gold standard for open inguinal hernia repair [8,9]. The recurrence rate of traditional sutured hernia repair techniques is reported to be between 0.7% and 9.3% [10]. On the other hand, the recurrence rate of tension-free network repair is less than 1% [11].

This study aims to present our experience with the use of MDR (posterior wall reconstruction and darning on it) technique for inguinal hernia repair in a tertiary hospital in our country. In addition to the demographic characteristics of the patients in our clinic, to evaluate the results in terms of postoperative complications and recurrence rates in the light of the literature. Standardizing any surgical procedure and adopting it as a training curriculum may be the most important key to increasing quality and improving outcomes for this technique.

Material and methods

The records of all patients who underwent IHR with the MDR method in our clinic between January 2012 and December 2021 were obtained from the hospital database. Demographic characteristics, intraoperative findings, postoperative complications and recurrence rates of the patients were analyzed retrospectively. All patients were controlled in the outpatient clinic. The clinical studies of our hospital were approved by the ethics committee (Decision No: 2022/514/223/1 and Date: 13.04.2022).

Incarcerated and strangulated inguinal hernias, recurrent hernias, non-American society of anesthesia (ASA) 1-3, scrotal hernias performed in the emergency were not included in the study. All patients were operated in the supine position and under spinal anesthesia. It was supported by general anesthesia if the spinal anesthesia is insufficient. However, patients who were converted to general anesthesia were not included in the study. The surgical procedure was performed by two specialist surgeons and their team. Hernia type was determined after exploration with standard inguinal incision, sac preparation and herniectomy were performed in indirect hernias. With 1/0 or 0/0 non-absorbable propylene suture, posterior wall reconstruction (plication) is provided starting from the pubic tubercle up to the annulus inguinalis profunda with continuous sutures. The defect between the tendon conjugate and the inguinal ligament was repaired without tension using the darning method with the same suture (Figure 1-4). MDR was not performed for recurrent and scrotal inguinal hernias.

All patients who underwent MDR technique for IHR in our clinic were examined. Information on demographic characteristics (age, gender), hernia type, operation details (anesthesia method and operation time), and postoperative results (hospitalization time, return to daily activities) were obtained. This information was obtained from the hospital archive. The study team followed all patients who underwent MDR up in the outpatient clinic. Post-operative complications; hematoma, surgical site infection and recurrence information were obtained from the outpatient clinic records.

The patients did not have any comorbidities such as chronic liver disease, ascites, immunocompromised, etc. that could affect the outcome. Duration of surgery; it was measured as the time from skin incision to skin closure. Intravenous non-

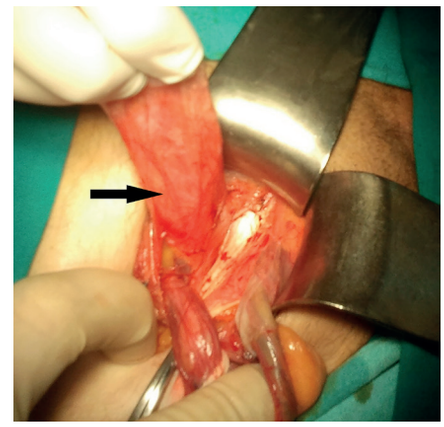


Figure 1 - Prepared direct inguinal hernia (IH) (arrow).

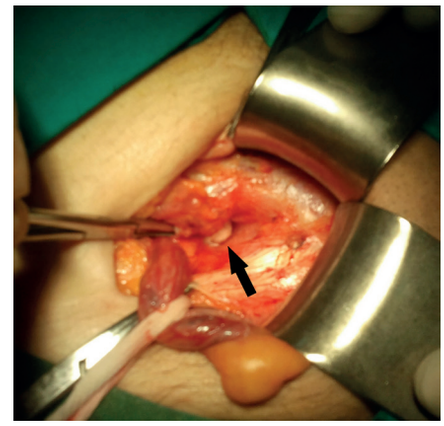


Figure 2 - Reduced inguinal hernia after direct inguinal hernia preparation (arrow).

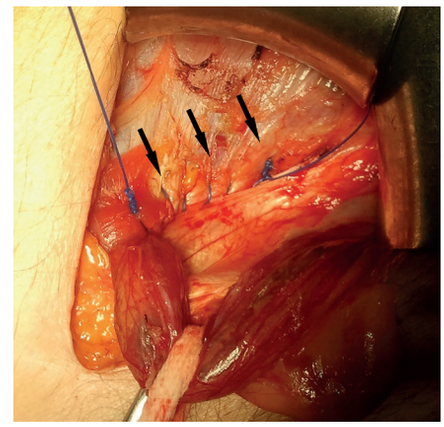


Figure 3 - Posterior wall reconstruction (posterior wall defect plication) (arrows).

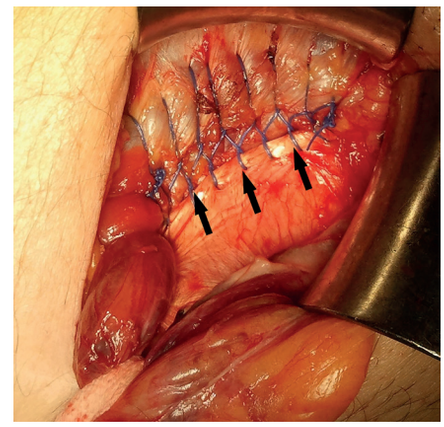


Figure 4 - Modified darning method in inguinal hernia repair (arrows).

steroidal anti-inflammatory drugs (NSAIDs), which is the routine analgesia application of our clinic in the early postoperative period, was used. In addition, patients who were discharged were given oral NSAIDs.

Statistical analysis

Statistical analysis of data was performed using SPSS™ software, version 20. Continuous variables were described as median and normal range. Categorical variables were reported using numbers and proportions. Qualitative data were described using the number and percent. Pearson's chi-square test was used for qualitative data and Student's t-test for quantitative data. All data were expressed as mean (min-max) except when otherwise indicated.

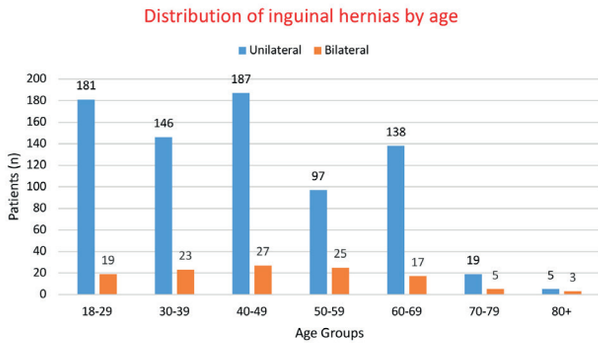
Results

Between January 2012 and December 2021, a total of 7861 patients were operated due to inguinal hernia in the general surgery clinic of our hospital. Unilateral without graft IHR: 773 (9.83%), unilateral grafted IHR: 5318 (67.65%), bilateral without graft IHR: 119 (1.52%), bilateral grafted IHR: 573 (7.3%), laparoscopic totally extraperitoneal (TEP) unilateral IHR was 907 (11.53%), and laparoscopic TEP was bilateral IHR: 171 (2.17%) (Table 1). We included a total of 892 patients who underwent MDR.

Table 1 Distribution according to IHR operation method.

Operation method in IHR	n	%
Without graft (MDR Method), unilateral:	773	9,83
Grafted (Lichtenstein method), unilateral:	5318	67,65
Without graft (MDR Method), bilateral:	119	1,52
Grefted (Lichtenstein method), bilateral:	573	7,30
Laparoscopic TEP, unilateral	907	11,53
Laparoscopic TEP, bilateral	171	2,17
Total:	7861	100

IHR: Inguinal Hernia Repair, MDR: Modified Darn Repair, TEP: Totally extraperitoneal, n:Number



Graphic 1 - Distribution of patients undergoing MDR in IHR by age.

A total of 892 patients, 832 males and 60 females (male/female = 14/1), with a mean age of 49.4 years (18-85), were studied (The distribution of patients by age is as in Graphic 1). Of 1011 elective IHRs, 773 were unilateral (right/left: 452/321=58% right, 42% left) and 119 (119 right + 119 left) were bilateral inguinal hernias. Of the hernias, 667 (66%) were indirect, 273 (27%) were direct, and 71 (7%) were pantaloon (combined) hernias. All procedures were performed under spinal anesthesia. The mean duration of surgery was 35 (15-75) minutes, hospital stay was 1.1 (1-3) days, and return to normal activities was 12.8 (10-20) days (Table 2).

Table 2 Demographic and clinico-pathological features of the patients.

FEATURES		RESULTS	TOTAL	p VALUE
Gender (n, %)	Male	832 (93.25%)	892	<0,01
	Female	60 (6.75%)		
Age (years)	Median (Interval)	49.4 (18-85)		
Side of Hernia (n, %)	Right	452 (58%)	773	>0,05
	Left	321 (42%)		
	Bilateral		119	
Type of Hernia (n, %)	Direct	667 (66%)	1011	<0,05
	Indirect	273 (27%)		
	Combined (Pantaloon)	71 (7%)		
Duration of Surgery (minutes)	Mean (Interval)	35 (15-75)		
Hospital Stay (days)	Mean (Interval)	1.1 (1-3)		
Return to Normal Activities (days)	Mean (Interval)	12.8 (10-20)		
Follow-up (years)	Mean (Interval)	4.6 (1-10)		

Complications were seen in 59 (5.83%) patients in the early postoperative period. The most commons were hematoma, seroma and wound infection. Patients with early complications were treated in the ward at the bedside or in the outpatient setting. None of these patients were operated on again. The patients were followed up in the outpatient clinic. Late complications were seen in 26 (2.6%) cases. Of the 25 recurrences, 12 were unilateral and 13 were in patients with bilateral IHR. Rejection to the suture material developed in 1 patient (Table 3).

Table 3 Postoperative complications.

	Complication	n	%	Total
Early	Hematoma	11	1.09	59(%5,83)
	Seroma	15	1,48	
	Wound infection	33	3,26	
Late	Rejection	1	0,12	26 (%2,6)
	Recurrence	25	2,4	

Discussion

Many surgical methods have been described in the IHR and clinical researches have been conducted. These are basically grafted or non-grafted anterior approach and posterior approach methods and laparoscopic methods. Anterior and tension-free repairs are now the most common procedures. The aim of all these types of operations is to achieve lower recurrence and complication rates, earlier return to daily activities and less cost. The mean age of the patients, male:female ratio, operation time, length of hospital stay, hernia types (indirect, direct, pantaloon) were consistent with the literature. All procedures were performed under spinal anesthesia, but when spinal anesthesia was insufficient, general anesthesia had intervened.

The Lichtenstein technique and its modifications have become the most popular and frequently performed methods, but there is a high incidence of chronic inguinal pain following hernia repair and reportedly ranges from 28.7% to 43.3% [12,13]. If inguinal sepsis occurs after graft repair, complete removal of the graft is required to treat sepsis [14]. Potential damage to the

spermatic cord and nerve compression following graft repair due to extensive fibrosis are also concerns raised by this technique [15]. Laparoscopic hernia repairs are costly [16] and have a long learning curve [17]. The anterior approach and open methods without the use of grafts also have disadvantages among themselves. The Shouldice technique, which is considered the gold standard among these methods, has 1-4% recurrence rates in specialized centers [18,19]. Long learning curve, risky dissection of the inguinal floor and insufficient experience; this makes it inaccessible to surgeons working outside specialized centers for this method [20]. IHR with the Darning method has the advantage of a short learning curve [21].

Complications were observed in a total of 59 (5.83%) patients in the early postoperative period. The most common of these was surgical site infection with 33 (3.26%) cases. These cases healed within a week with antibiotics and dressings. Essawy et al. reported 7.5% [22] and a study by Olasehinde et al. reported 4.5% surgical site infection [23]. On the other hand, hematoma developed in 11 (1.09%) cases and seroma developed in 15 (1.48%) cases. The patients recovered spontaneously with anti-edema and scrotal elevation. Essawy et al. 12.5% [22] and Olasehinde et al [23] reported hematoma/seroma in 1.5% of cases in the study. Postoperative early complications are consistent with the literature. In our study, none of these patients required additional surgical intervention.

Late complications were seen in 26 (2.6%) cases. Rejection against the suture material developed in 1 (0,12%) case. The patient, who did not recover with conservative care, was treated in operating room conditions by removing sutures. In our study, recurrence was seen in 25 (2.4%) cases. When the articles published in the IHR using the Darn method are examined in the literature; Essawy et al. [22] 0%, Olasehinde et al. [23], 1.5%, Memon et al. [24] 1.5%, Manzoor et al. [25] 0.8%, Farooq et al. [8] 0.6%, Kamran et al. [26] reported a recurrence rate of 0%. Investigators, reported 0% recurrence, have published articles with short-term follow-up. In addition, these are mostly studies conducted in the direction of early complications and return to normal activities. In our study, the mean follow-up period of the patients was 4.6 years.

In our study, most of the recurrence cases were bilateral IHR. Recurrence was 12/773 (1.6%) in unilateral, whereas it was 13/119 (10.1%) in bilateral IHR. Johansen et al. reported 13% recurrence rate in bilateral inguinal hernia repair in a large series [27]. When bilateral and unilateral IHR are compared; It has been reported that the risk of recurrence is 32 times than more with bilateral IHR [23]. However, the reason for this is not fully specified. Predisposing factors should be investigated in detail in patients with bilateral inguinal hernia and precautions should be taken against possible recurrences. Because of that, some surgeons recommend grafted repair in bilateral IHR [23,27].

The hospital stay was 1.1(1-3) days and the return to normal activity was 12.8 (10-20) days. Memon et al. reported 2-4 days for hospitalization and 14-21 days for return to daily activities [24]. In another graft-free IHR publication, it is stated that return to work takes an average of 8.62 days (6-14) [28]. Although the hospitalization and return to normal daily activities data were different, they were found to be compatible with the literature data.

Our study has advantages as well as disadvantages. The disadvantages are that it is retrospective and not comparable to any other method. The advantages of our study are that all kinds of techniques are performed in IHR in our clinic, the number of patients is very high compared to the literature, and we obtain long-term data. Since pain is a subjective finding, the study was not performed. Local magnetic resonance imaging is required for nerve injury. It was not done because it was an additional cost for the patient. We believe that the study would be more valuable if the patient was evaluated with a visual analog scale (VAS) for chronic pain.

Conclusion

The aim of every surgeon when performing IHR is to repair without recurrence and without leaving a foreign body in the patient. MDR is a procedure that every surgeon can do with an easy learning time. It has a recurrence rate comparable to any other procedure for IHR. MDR technique is a reliable and effective method. Despite the criticism, we believe that the Darn technique is a viable option for inguinal hernia repair. We do not recommend the MDR method in bilateral IHR.

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