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Is really posterior approach better than anterior in recurrent inguinal hernia?

Minimally invasive preperitoneal single-layer mesh vs Lichtenstein repair

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Abstract
Aim: In inguinal hernia operations, patient comfort is as important as postoperative recurrence in the success of surgery. The aim of this study is to compare the effects of minimally invasive preperitoneal single-layer mesh (MIP) and Lichtenstein repair (LR) on patient comfort in patients with recurrent inguinal hernia (RIH).
Material and Methods: The files of 107 patients with RIH were retrospectively reviewed. 48(%44.8)patients had MIP and 59(%55.2) patients had LR. Sheffield Pain Scale(SPS) and Verbal Pain Scale (VPS) were used for the evaluation of pain scores. Patients were questioned during preoperative period, postoperative 1st month and 1st, 3rd, 6th, 9th years regarding SPS, VPS and ability to perform daily activities.
Results: The mean time to return to work was 10 days shorter in the MIP group. There was no significant difference between the groups in terms of preoperative SPS scores, ability to perform daily activities and VPS scores. Both early postoperative pain scores as the SPS (1.24 vs 1.68, respectively, p = 0.01) and VPS scores (3.67 vs 4.68, respectively, p = 0.02) and late postoperative SPS scores (1.10 vs 1.30, respectively, p = 0.02) and VPS scores (2.46 vs 3.61, respectively, p = 0.04) were lower in the MIP group when compared with the LR group. The patient comfort parameters were significantly improved in the MIP group.
Discussion:The number of studies investigating patient comfort in recurrent hernias is very low in the literature. According to our study, MIP seems to be a better technic for recurrent inguinal hernias.

Keywords
Recurrent Inguinal Hernia, Lichtenstein Repair, Minimally Invasive Preperitoneal Repair, Patient Comfort

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Introduction

Despite advances in inguinal hernia surgery, recurrent inguinal hernia (RIH) repair remains an important problem [1]. The recurrence rate after primary inguinal hernias is around 16-18%, while more than 30% recurrence is reported after RIH surgery [1,2]. Recurrence rates after hernia surgeries have been decreased with developing technologies, so the focus is now on clinically improving patient comfort. In particular, early return to daily activities and chronic inguinal pain sufficient to impair quality of life are factors determining patient comfort after inguinal hernia surgery. Nienhuijcs et al. reported that open preperitoneal repair caused less postoperative pain than the Lichtenstein procedure in primary inguinal hernias [3]. However, there are only few studies investigating the effect of anterior and posterior approach on patient comfort in RIH surgery. Therefore, there is no consensus on the ideal surgical method to preferred for RIH [4].

The aim of this study is to compare the effects of minimally invasive preperitoneal single layer patch (MIP) and Lichtenstein repair (LR) on postoperative pain and patient comfort in patients with RIH.

Material and Methods

Patients who applied to Konya Education and Research Hospital General Surgery Clinic for RIH between February 2009 and February 2018 and aged 18 years or older were included in this retrospective study. Female patients, patients presenting with femoral hernia, obstructive or incarcerated inguinal hernia, or bilateral inguinal hernia, patients with chronic comorbitic disease such as diabetes, congestive heart failure, cirrhosis, and patients with malignancy or immune system defect were excluded from the study. Informed consent was obtained from each patient before enrolment in the study.

Surgical procedures

The surgical method was determined according to the preferences of the surgeon in all patients. Spinal or general anesthesia was used according to the patient's preference and medical condition.

Minimally invasive preperitoneal single-layer mesh

This procedure is basically similar to the Kugel repair [5], but the only difference is that the mesh we used is a single-layer, 14x9 cm oval shaped polypropylene mesh (Prolene ©, Ethicon, San Loreno, Puerto Rico) that is prepared preoperatively in order to prevent the mesh from folding, we created lines with no:1 PDS (Pedesente ©, Doğsan, Trabzon, Turkey) in 4 rows in an oval shape (Figure 1). Then we used 2x2 cm polypropylene mesh to create a pocket on the main mesh to allow the entrance of the index finger and fixed it again with no:1 PDS. This pocket allowed the mesh to be placed properly in the preperitoneal area without folding.

On the operation side, the skin and subcutaneous tissues were passed through a 4 cm transverse incision, 1/3 lateral and 2/3 medial from the midpoint of the distance between the tuberculum pubicum and the anterior superior of the iliac spine. After muscle dissection, preperitoneal area was reached. Spermatic cord structures were found and hernia sac was dissected. The inferior preperitoneal distance was opened by blunt and sharp dissection up to the Cooper ligament. In this way, enough space was created to cover the anulus inguinalis profundus and to ensure full spread of the mesh. Mesh is wrapped on the finger by entering the pocket on the mesh with the index finger and was laid to completely cover the anulus inguinalis profundus at the level of the Cooper ligament. Thus, the medial edge of the mesh was located at symphysis pubis, lateral edge was located 3 cm lateral to the annulus inginalis profundus, and the lower edge was located 3 cm below the inginal ligament [6]. While closing, one suture was passed from fascia transversalis and the mesh.. The other anatomical structures were closed one by one and the operation was completed.

Lichtenstein repair

The classic LR was performed as described by Amid et al [7].

Evaluation of patient characteristics and comfort

Patients were divided into two groups according to the type of the surgical procedure. Age, body mass index, operative findings (direct, indirect hernia), duration of surgery, length of hospital stay, and early postoperative complications were reviewed from the patient files.

In our clinic, we routinely apply questionnaires preoperatively and in the postoperative first month to all patients who underwent RIH surgery to evaluate chronic pain and ability to perform daily activities, and to assess pain severity during activity. The time to return to work after surgery, the presence and severity of postoperative chronic pain, and the ability to perform daily activities were evaluated with a face-to-face questionnaire preoperatively and in the postoperative 1st month. These data were reviewed retrospectively. In addition, all patients were questioned via phone calls, by a third specialist who was blinded to the surgical procedure, at 1st, 3rd, 6th and 9th years regarding the development of recurrence, pain state using the Sheffield Pain Scale (SPS) and Verbal pain Score (VPS), the ability to perform daily activities, and the severity of pain during daily activity. The presence and severity of chronic pain were performed according to the SPS, which was rated at 4 points [8]. The Sheffield Pain Scale was as follows: 0, no pain; 1, no pain at rest, but pain on movement; 2, relieving pain at rest but moderate pain on movement; 3, continuous pain at rest and severe pain during movement. The ability to perform daily activities was assessed using a questionnaire system consisting of 9 questions that evaluated the presence of pain during simple movements in daily life to challenging sports activities. It was accepted that the daily activities were restricted in patients who answered yes to 5 or more questions. In addition, the severity of pain during the daily activities of the patients was evaluated with VPS. In VPS, we classified 0 as no pain, and 10 as irresistible pain and asked patients to score the pain they felt during daily activities between these numbers.

Statistical analysis

Mean, standard deviation, median, lowest, highest, frequency and ratio values were used in descriptive statistics of the data. The distribution of variables was measured using the Kolmogorov-Simirnov test. The Mann-Whitney U test was used for the analysis of quantitative independent data. The chi-square test was used for the analysis of qualitative independent data and the Fischer test was used when the chi-square test conditions were not met. SPSS 22.0 program was used in the analysis.

Results

A total of 124 patients were included in the study. However, 17 patients who could not be reached at the last call were excluded from the study, and 107 patients were finally included in the study. There were 48 (%44.8) patients who had MIP and 59 (%55.2) patients in the LR group. All patients included in the study were male. The mean age of the patients was 38.26 ± 12.04 (20-60 years), and the mean BMI was 28.1 ± 6.01 (24.1-35.6) kg/m2. The primary surgery of all patients was LR. Seven (12.2%) patients had undergone LR surgery twice. The time between primary surgery and recurrence ranged from 6 weeks to 10 years. Both groups were statistically similar in terms of age, BMI, operation time and hospital stay.

Twenty-eight (%26.1) patients had direct, 71(%66.3) patients had indirect and 8 (%7.6) patients had a combined hernia. The mean operative time was 40.2 ± 22.45 minutes. Fifty patients were operated under spinal anesthesia, and 7 patients required general anesthesia. No major complication was observed in any of the operations. Postoperative complications are listed in Table 1. The mean hospital stay was 1.09 ± 0.31 days. Most patients were discharged on the first postoperative day. However, 8 (%7.4) patients who developed hematoma were followed up conservatively for 2 days and no additional treatment was required. Antibiotic treatment was started in 3 (%2.8) patients who developed superficial surgical site infection; wounds were cleansed and dressed, and the patients were discharged on the 3rd day without mesh excision. There was no statistically significant difference between the groups in terms of early complications.

The mean follow-up period was 63.12 ± 12.14 (24-105) months. One recurrence was observed in both groups. Pseudohernia was detected in 2 (%4.1) patients in the MIP group in the early postoperative period. However, the pseudohernia disappeared in the first month of the follow-up of these patients. The mean time to return to work was 17.1 ± 9.14 (10-31) days in the MIP group and 26 ± 12.24 (11-44) days in the LR group, and the time to return to work was significantly lower in the MIP group (p = 0, 02).

Chronic pain was evaluated according to the SPS during the preoperative period, postoperative 1st month and 1st, 3rd, 6th, 9th years. There was no significant difference between the groups in terms of preoperative pain scores. In the postoperative follow-up, pain scores were significantly lower in the MIP group compared to the LR group both in the 1st month and in the third year or late period (Table 2).

In the preoperative period, there was no significant difference between the groups in terms of the number of patients whose daily activities were restricted and VPS scores. However, both the number of patients whose daily activities were restricted and VPS scores decreased significantly in the MIP group in the first postoperative month, and this decrease was also significant in the long term (Table 3). Seven patients in the MIP group, and 13 patients in the LR group reported using analgesic drugs for 1 month. Although no patients in the MIP group had a long-term history of analgesic drug use, 6 patients in the LO group needed analgesic drugs until the 6th month.

Table 1. Distribution of early postoperative complications by groups

Complications	MIP Group	LR Group	p
	N (%)	N (%)	
Seroma	4(8.3)	3(5)	
Scrotal edema	1(2)	4(6.7)	
Hematoma	4(8.3)	5(8.4)	p>0.05
Wound infection	1(2)	2(3.3)	
Cord edema	3(6.2)	2(3.3)	

MIP: Minimally invasive preperitoneal single layer patch, LR: Lichtenstein repair, N: Number

Table 2. Preoperative and postoperative pain scores of the groups on the Sheffield Pain Scale

	MIP Group	LR Group	p
Preoperative	1,94±0,69	2,01±0,68	0,803
1st month	1,24±0,72	1,68±0,81	0,01
Late period	1,10± 0,40	1,30± 0,70	0,02

MIP: Minimally invasive preperitoneal single layer patch, LR: Lichtenstein repair, N: Number

Table 3. Preoperative and postoperative ability to perform daily activity questionnaire data distribution by groups as the VPS scores

	MIP Group (n=48)	LR Group (n=59)	p
	N/ %	N/ %	
Preoperative			
Severity	6.43± 6,69	6,96± 9,78	0,124
Incidence	34(%70)	48(%81)	0,634
1st month			
Severity	3,67± 7,72	4,68± 5,81	0,02
Incidence	19(%39.5)	31(%52.5)	0,044
Late period			
Severity	2,46± 4,40	3,61± 5,70	0,041
Incidence	6(%12.5)	18(30)	0,03

MIP: Minimally invasive preperitoneal single layer patch, LR: Lichtenstein repair, N: Number, VPS: Verbal Pain Score



Figure 1. Appearance of a custom structured single-layer mesh

Discussion

The popularity of preperitoneal approaches is increasing along with the recent advances in surgery, especially in RIH repair, reducing the risk of damage to testicular blood vessels, lymphatics and ilioinguinal nerves by providing untouched space. Indeed, Bin Yang et al. reported that there was no chronic inguinal pain and scrotal complication in inguinal hernia repair by preperitoneal approach [9]. Also, the re-recurrence of preperitoneal interventions after RIH is reported to be between 10% [10]. Despite the superiority of the results of preperitoneal repair, LR still continues to be performed in the majority of the surgeries for RIH [11,12]. There is still no consensus about the best surgical method, especially in RIHs developed after hernia repair with anterior approach [13].

In this retrospective study, we compared the effects of MIP and LR on patient comfort in recurrent inguinal hernia repair and observed some important findings. Although there are studies comparing the effects of hernia repair techniques on chronic pain and quality of life, to the best of our knowledge, there are only few studies in the literature evaluating the effects of repair techniques on patient comfort [6,14,15]. In the study by Arslan et al., which compared the results of preperitoneal repair and LR in primary inguinal hernias, it was reported that preperitoneal repair caused less chronic pain during the 2-year follow-up period [6]. In this study, a single-layer polypropylene mesh was used instead of the double-layer mesh, which Kugel described in the classical preperitoneal repair method [5]. In the study of Yang et al., which compared the effects of different surgical techniques in patients with recurrent inguinal hernia, it was reported that 10.3% of the patients had chronic inguinal pain, and 6% had a restriction in daily activities [16]. In our study, unlike the Kugel technique, we used a single-layer mesh in MIP repair. In this way, we think that the mesh load is reduced. There was no significant increase in recurrence rates after single layer mesh usage.

It is known that laparoscopic surgery provides less incidence of chronic pain, less wound related problems, and return to daily activities in a shorter period of time in primary hernias compared to open surgery [17], but there are long learning curves and cost increases in laparoscopic procedures. In their study comparing laparoscopic and open preperitoneal approaches in RIHs, Feliu et al. reported that both methods are very effective, but the length of hospital stay was shortened in the laparoscopic group [18]. Our study is consistent with the study of Feliu et al.

In our study, operative times and postoperative recurrence rates were also similar with LR. Therefore, we believe that MIP method can be safely preferred in RIHs both in terms of ease of learning and cost.

One of the rare studies investigating the effect of surgical methods on patient comfort and chronic pain in recurrent inguinal hernias is a meta-analysis reported by Sevonius et al. [19]. In this study, it was reported that endoscopic preperitoneal interventions caused less chronic pain, discomfort, and insufficiency in physical activities compared to LR repair. In the literature, there are rare clinical studies examining the effect of anterior and posterior interventions on patient comfort and chronic pain after recurrent surgery. We hope that we will contribute to the literature with this study. In our study, we observed significantly less chronic pain rates in MIP group at 1st, 3rd, 6th and 9th years. In addition, while the postoperative complications were similar, the time to return to work was shorter in the MIP group.

There was one recurrence in both groups. Therefore, we could not evaluate the effect of the method used in RIH repair on recurrence. According to the algorithm specified by Schwab, it is recommended that posterior approach should be preferred for recurrences after LR [20]. In our study, there was no difference between the two groups in terms of complication rates. However, we can say that MIP is superior in the treatment of recurrences after LR due to the decrease in chronic pain and increase in physical activity ability in the long term.

Sevonius et al. reported that 29% of the patients had pain that limits their physical activities and 6% had pain that affects daily activities after the surgery performed for RIH [19]. Although chronic pain seems to have decreased to some degree in the first years after hernia repair, it may still limit the patient's ability to perform daily activities and affect health-related quality of life [21,22]. In our study, 77.1% of the patients stated that there was pain that limited daily activities during the preoperative period.

However, limitation in daily activities was significantly less in the MIP group both in the short term and long term after surgery (MIP vs LR; 39.13% vs 52.9%, and 13.4% vs 29.4%, respectively).

This study had some limitations. As it was a retrospective study and some demographic features could not be standardized.

Conclusion

MIP repair can be preferred as a surgical method in RIHs because it leads to less chronic pain and an İncrease in patient comfort both in the short term and long term, and it is an effective, less costly and safer method.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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