Zgodnji pooperativni izidi v retrospektivni primerjavi med metodo po Lichtensteinu in Rutkow-Robbins metodi pri operaciji dimeljske kile

Early postoperative outcomes in a retrospective comparison between Lichtenstein repair method and Rutkow-Robbins repair method for inguinal hernia repair

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Izvleček

Namen: *Namen te retrospektivne študije je bil raziskati razlike v pooperativnih izidih pri bolnikih z dimeljsko kilo, zdravljenih z Lichtensteinovo ali Rutkow-Robbinsovo hernioplastiko.*
Metode: *Retrospektivno je bilo analiziranih 90 moških bolnikov, operiranih po bodisi Lichtensteinovi bodisi Rutkow-Robbinsovi metodi. Opazovane spremenljivke so bile pooperativni zapleti, in sicer zastajanje urina, zgodnja in pozna pooperativna krvavitev, bolečina in uporaba analgetikov, okužba rane in mrežice, skrotalni hematom in atrofija testisa, čas do mobilizacije bolnika ter ponovitev kile.*
Rezultati: *Med skupinama, operiranima po ali Lichtensteinovi ali Rutkow-Robbinsovi metodi, statistično značilnih razlik v pojavnosti spremljanih pooperativnih zapletov ni bilo ugotovljenih ($p > 0{,}005$).*
Zaključek: *Ta študija je pokazala, da med skupinama, operiranima po*

Abstract

Purpose: *The purpose of this retrospective study was to determine the difference in postoperative outcomes in inguinal hernia patients treated with a Lichtenstein or Rutkow-Robbins hernioplasty.*
Methods: *Ninety male patients who underwent a Lichtenstein or Rutkow-Robbins hernioplasty were retrospectively analysed. The observed variables were postoperative outcomes, specifically urinary retention, early and late postoperative bleeding, pain and analgesic usage, wound and implant infection, scrotal hematoma and testicular atrophy, patient mobilization time, and hernia recurrence.*
Results: *No statistically significant differences in the incidence of postoperative outcomes were detected between the Lichtenstein and Rutkow-Robbins hernioplasty groups ($P > 0.005$).*

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Lichtensteinovi metodi in Rutkow-Robbinsovi metodi, v pooperativnih izidih statistično značilnih razlik ni.

Conclusion: *No statistically significant differences in postoperative outcomes were detected between patients undergoing Lichtenstein and the Rutkow-Robbins hernioplasty repairs.*

INTRODUCTION

Inguinal hernia repair is among the most frequently performed surgeries globally with over 20 million operations performed each year (1). Despite advances in surgical techniques and medical technologies, no unified agreement exists regarding the optimal approach for repairing inguinal hernias (1). In 1986 Lichtenstein introduced a tension-free mesh repair technique utilising a polypropylene mesh to reinforce the fascia transversalis. This innovation was followed by the development of the mesh plug repair technique, which has since gained popularity and shown favourable outcomes in certain US centres (2). The Lichtenstein repair method (LRM) is considered relatively straightforward compared to the Rutkow-Robbins repair method (RRRM) because the LRM involves placement of a polypropylene mesh at the site of the hernia defect (3,4). The primary objective of successful hernia repair is to minimise complications and recurrence, while ensuring a quick recovery with minimal discomfort that enables patients to resume normal activities as soon as possible. Inguinal hernias represent 75% of abdominal wall hernias with a 27% and 3% lifetime risk of recurrence among males and females, respectively. Some patients have characteristics that increase the risk of postoperative complications and hernia recurrence (5).

Few studies have compared the efficacy of different types of hernia repairs. Karaca et al. (6) compared the Lichtenstein and Gilbert double-layer techniques in treating patients with inguinal hernia and found that the LRM was superior with respect to costs and venous blood flow with no other significant differences.

In this study, we compared The postoperative complications and recurrence between two hernia repair methods (LRM with a mesh and RRRM with a mesh and plug) in patients with unilateral inguinal hernias were compared in the current study.

MATERIALS AND METHODS

The current study was designed as a retrospective analysis of postoperative complications in 90 male patients diagnosed with inguinal hernias between 2016 and 2018, none of whom had undergone prior surgical intervention. Patients < 18 years of age, as well as patients with bilateral inguinal, recurrent, or incarcerated hernias, were excluded. The patients underwent an LRM or RRRM repair (n = 45 each). The same surgeon performed all surgeries and the mean follow-up period was two years. The two groups of patients were evaluated for age, body mass index (BMI), co-morbidities, American Society of Anaesthesiology (ASA) score, and hernia type, as classified according to the Nyhus system based on superficial ultrasonography and hernia location. Patients were admitted to the hospital 1 day prior to surgery and preoperative medications were administered 30 min before surgery. Inguinal hair was shaved in the operating room using electric clippers immediately before surgery. General and spinal anaesthesia was used in 22 and 68 patients, respectively. All patients received prophylactic antibiotics (cefazoline) and antithrombotic therapy (nadroparin). The criteria for hospital discharge included subjective wellbeing, no major postoperative complications (hematoma, urinary retention, seroma, and wound infection), limited mobility (i.e., ability to ambulate to and from the bathroom independently), and pain controlled with oral analgesics. Postoperative outcomes, including complications (pain, as measured

on a visual analogue scale (VAS) in which 0 = no pain and 10 = unbearable pain), analgesic requirements, urinary retention, early and late bleeding, scrotal hematoma, testicular atrophy, wound or implant infection, early and late patient mobilisation, and hernia recurrence, were compared. Patients were followed for 2 years postoperatively per the clinical practice in our Department and because nearly 25% of hernia recurrences occur during this time (7).

Surgical technique

The operative field was shaved in the operating room immediately prior to surgery following the induction of general anaesthesia or administration of spinal anaesthesia. Antibiotic prophylaxis was given (cefazoline). Skin disinfection was performed using 10% povidone-iodine and the surgical area was covered with sterile drapes.

The operation in the LRM group began with an oblique incision in the inguinal region, approximately 5 cm long, starting approximately 4 cm medial to the inguinale ligament. Fatty and aponeurotic tissues overlying the aponeurosis of the obliquus externus muscle were dissected sharply to expose the underlying aponeurosis. The aponeurosis was

Figure 1. *An inguinal hernia repaired using the Lichtenstein repair method with polypropylene mesh.*

Figure 2. *An inguinal hernia repaired using the Rutkow-Robbins repair method with mesh plug.*

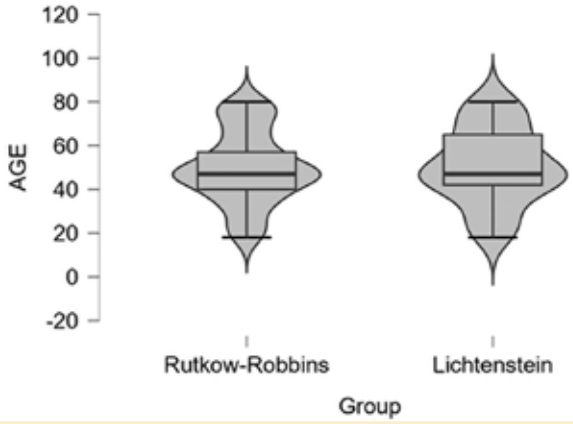

Figure 3. *Box-plot graph of patient age for both groups.*

then incised towards the pubic tubercle.
Then, cremaster fibres were detached from the aponeurosis above the pubic tubercle. Care was taken to preserve the spermatic cord and the genital branch of the genitofemoral nerve. The spermatic cord was placed on a thin rubber drain and the region from the pubis-to-the internal inguinal ring was examined. The ilioinguinal nerve was also preserved during the dissection. The hernial sac was identified and a herniotomy was performed. The hernia sac was then ligated at the level of the neck of the hernia, then excised. A pre-prepared polypropylene mesh was placed and adjusted over the fascia transversalis and fixed in place using tissue glue (Figure 1).
The dissection to the hernia was performed in the RRRM groups using the same technique as the LRM group. The hernial sac was not excised, rather inverted into the abdominal cavity and a mesh plug was then inserted into the internal inguinal ring, leaving the narrow end within the ring. The flat mesh was positioned over the transverse fascia covering the plug and secured with tissue glue. This method was

Table 1: *Patient age, operative time, and BMI for both groups and normality and equality of variances tests for age, operative time, and BMI for both groups*

	AGE		OP. TIME		BMI	
	RRRM	LRM	RRRM	LRM	RRRM	LRM
Valid	45	45	45	45	45	45
Missing	0	0	0	0	0	0
Median	47.000	47.000	55.000	55.000	21.000	23.000
Mean	49.644	50.267	57.311	53.689	21.200	23.244
Std. Deviation	16.561	17.155	8.179	7.245	2.668	2.932
IQR	17.000	23.000	15.000	6.000	2.000	3.000
Minimum	18.000	18.000	45.000	40.000	17.000	18.000
Maximum	80.000	80.000	75.000	73.000	26.000	30.000

Test of Normality (Shapiro-Wilk)		
Residuals	W	p
AGE	0.957	0.004
OP. TIME	0.972	0.050
BMI	0.964	0.014

Test of Equality of Variances (Brown-Forsythe)				
	F	df1	df2	p
AGE	0.146	1	88	0.703
OP. TIME	1.066	1	88	0.305
BMI	0.259	1	88	0.612

Significant results suggest a deviation from normality

Table 2: *Both study groups divided by type of anaesthesia used for surgery*

Group	Type of anesthesia	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	General	12	26.667	26.667	26.667
	Spinal	33	73.333	73.333	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	General	10	22.222	22.222	22.222
	Spinal	35	77.778	77.778	100.000
	Missing	0	0.000		
	Total	45	100.000		

Table 3: *Frequency table for urinary retention in both groups with contingency table and chi-squared result for urinary retention*

Frequencies for urin. reten.

Group	Urin. reten.	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	No	39	86.667	86.667	86.667
	Yes	6	13.333	13.333	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	No	41	91.111	91.111	91.111
	Yes	4	8.889	8.889	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
urin. reten.	**RRRM**	**LRM**	**Total**
No	39	41	80
Yes	6	4	10
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X^2	0.450	1	0.502
N	90		

Note: Each cell displays the observed counts.

used for all patients in the RRRM group (Figure 2) (3). After the hernia repair the layers were closed anatomically in both groups. The aponeurosis of the external oblique muscle was sutured with 2-0 vicryl sutures. Subcutaneous tissue and skin were closed using 2-0 vicryl and 3-0 nylon sutures, respectively. The surgical site was cleansed with saline solution and a bandage was applied to complete the procedure.

Statistical analysis

The data collected in this study were analysed using the SPSS software package (version 20.0; SPSS

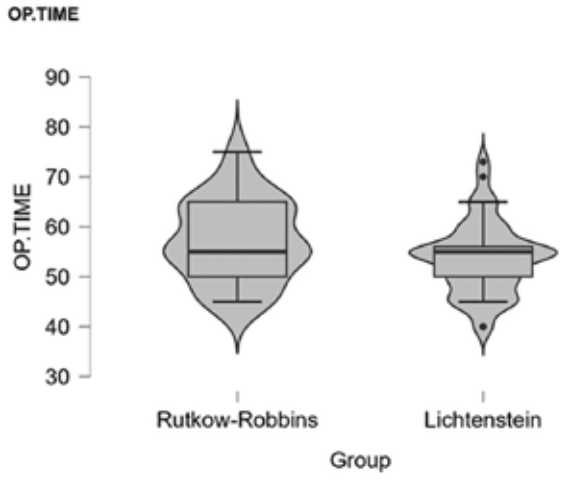

Figure 4. *Box-plot graph of operative time for both groups.*

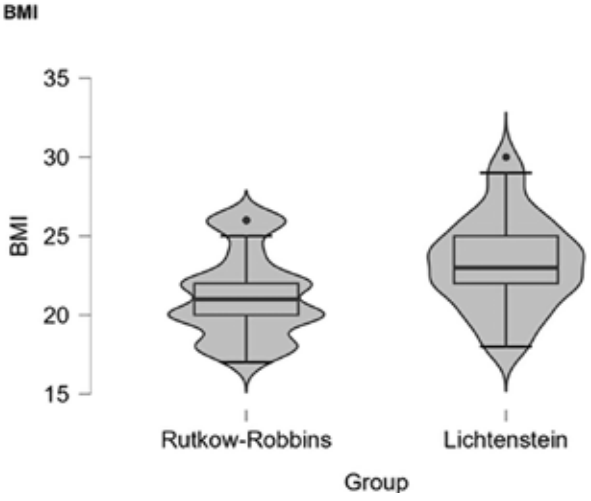

Figure 5. *Box-plot graph of operative time for both groups.*

Table 4: *Frequency table for early and late bleeding in both groups with contingency table and chi-squared result for both groups*

Frequencies for early bleed

Group	early bleed	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	No	40	88.889	88.889	88.889
	Yes	5	11.111	11.111	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	No	42	93.333	93.333	93.333
	Yes	3	6.667	6.667	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Early bleed	**RRRM**	**LRM**	**Total**
No	40	42	82
Yes	45	3	8
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X2	0.549	1	0.459
N	90		

Frequencies for late bleed

Group	Late bleed	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	No	43	95.556	95.556	95.556
	Yes	2	4.444	4.444	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	No	44	97.778	97.778	97.778
	Yes	1	2.222	2.222	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
late bleed	**RRRM**	**LRM**	**Total**
No	43	44	87
Yes	2	1	3
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X^2	0.345	1	0.557
N	90		

Statistics for Windows). Descriptive statistics, including frequency and percentage distributions, are presented. The Mann-Whitney U test was used for variables that did not follow a normal distribution, as determined by a normality test, to compare the two groups. The Wilcoxon signed-rank test was utilised for pre- and post-measurement comparisons of non-normally distributed variables. A significance threshold of 0.005 was applied for all analyses. Differences were considered statistically significant at a $P < 0.005$, while a $P > 0.005$ indicated no significant difference.

A chi-square test was used to assess dependencies between variables with the same significance level of 0.005. A P-value below this threshold indicated

Table 5: *Frequency table for wound infection and scrotal hematoma in both groups with contingency table and chi-squared result for both groups*

Frequencies for wound inf-seroma

Group	Wound inf-seroma	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	No	41	91.111	91.111	91.111
	Yes	4	8.889	8.889	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	No	42	93.333	93.333	93.333
	Yes	3	6.667	6.667	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Wound inf-seroma	**RRRM**	**LRM**	**Total**
No	41	42	83
Yes	4	3	7
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X^2	0.155	1	0.694
N	90		

Frequencies for scrotal hemat.

Group	Scrotal hemat.	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	No	39	86.667	86.667	86.667
	Yes	6	13.333	13.333	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	No	40	88.889	88.889	88.889
	Yes	5	11.111	11.111	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Scrotal hemat.	**RRRM**	**LRM**	**Total**
No	39	40	79
Yes	6	5	11
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X^2	0.104	1	0.748
N	90		

significant dependency, whereas a value above this threshold indicated no significant dependency.

All applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research.

RESULTS

Among 90 patients with inguinal hernias, 45 each underwent a Lichtenstein or Rutkow-Robbins hernioplasty and all received a polypropylene graft. The same surgeon operated on all patients in the same

Table 6: *Frequency table for testicular atrophy in both groups and contingency table for both groups*

Frequencies for testicular atrophy

Group	Testicular atrophy	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	No	44	97.778	97.778	97.778
	Yes	1	2.222	2.222	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	No	45	100.000	100.000	100.000
	Yes	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Testicular atrophy	**RRRM**	**LRM**	**Total**
No	44	45	89
Yes	1	0	1
Total	45	45	90

hospital. The characteristics of the LRM group were as follows: mean age, 50.3 years; male gender; mean BMI, 23.2 kg/m2; ASA score, 1 or 2; most patients had Nyhus type two inguinal hernias; and mean operative time, 53.7 min. The characteristics of the RRRM group were as follows: mean age, 49.6 years; male gender; mean BMI, 21.2 kg/m2; ASA score, 1 or 2; most patients had Nyhus type two inguinal hernias; and mean operative time, 57.3 min. Normality and equality of variances tests were performed to assess both groups (Table 1) and box-plot graphs were also created (Figures 3-5). Twelve patients in the RRRM group received general anaesthesia and 33 received spinal anaesthesia, while 10 received general anaesthesia and 35 received spinal anaesthesia in the LRM group (Table 2). Four patients (8.9%) in the LRM group and six patients (13.3%) in the RRRM group developed urinary retention (Table 3). Bleeding in the first 24 h after the procedure occurred in three (6.7%) and five patients (11.1%) in the LRM and RRRM groups, respectively. Bleeding > 24 h after the procedure occurred in one (2.2%) and two patients (4.4%) in the LRM and RRRM groups, respectively (Table 4). Wound and implant infections or seromas occurred in three patients (6.7%) in the LRM group and four patients (8.9%) in the RRRM group. Five patients (11.1%) in the LRM group and six patients (13.3%) in the RRRM group developed scrotal hematomas (Table 5). Testicular atrophy occurred in one patient (2.2%) in the RRRM group but in none of the patients in the LRM group (Table 6). No patients in either group developed a recurrent hernia. Twenty-two (48.9%), 14 (31.1%), and nine patients (20%) in the LRM group rated the pain intensity as0–3, 4–7, and 8–10, respectively. Fourteen (31.1%), 18 (40%), and 13 patients (28.9%) in the RRRM group rated the pain intensity as 0–3, 4–7, and 8–10, respectively. An analgesic dose of 5 g of metamizole per day was not sufficient for any patient. Fifteen patients (33.3%) in the LRM group required < 7.5 g of metamizole compared to nine patients (20%) in the RRRM group. Twenty-one patients (46.7%) in the LRM and RRRM groups required > 7.5 g of metamizole. Piritramide was used in nine patients (20%) in the LRM group and 15 patients (33.3%) in the RRRM group (Table 7). Nineteen patients (42.2%) in the LRM group were ambulating within the first 24 h after surgery compared to 15 patients (33.3%) in the RRRM group. Twenty-six (57.8%) and 30 patients (66.7%) were ambulating > 24 h after the procedure in the LRM and RRRM groups, respectively (Table 8). Thirty-four (75.6%), 9 (20%),and two patients (4.4%) in the LRM

Table 7: *Frequency table for pain assessment on VAS and dose of required analgesics in both groups with contingency table and chi-squared result for both groups*

Frequencies for pain assesment VAS

Group	Pain assesment VAS	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	1-3	14	31.111	31.111	31.111
	4-7	18	40.000	40.000	71.111
	8-10	13	28.889	28.889	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	1-3	22	48.889	48.889	48.889
	4-7	14	31.111	31.111	80.000
	8-10	9	20.000	20.000	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Pain assesment VAS	**RRRM**	**LRM**	**Total**
1-3	14	22	36
4-7	18	14	32
8-10	13	9	22
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X2	3.005	2	0.223
N	90		

Frequencies for dose of analgetics

Group	Dose of analgetics	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	Metamizole <7.5g	9	20.000	20.000	20.000
	Metamizole >7.5g	21	46.667	46.667	66.667
	Piritramide 22.5mg	15	33.333	33.333	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	Metamizole <7.5g	15	33.333	33.333	33.333
	Metamizole >7.5g	21	46.667	46.667	80.000
	Piritramide 22.5mg	9	20.000	20.000	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Dose of analgetics	**RRRM**	**LRM**	**Total**
Metamizole <7.5g	9	15	24
Metamizole >7.5g	21	21	42
Piritramide 22.5mg	15	9	24
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X2	3.000	2	0.223
N	90		

Table 8: *Frequency table for early and late mobilization in both groups with contingency table and chi-squared result for both groups*

Frequencies for early mobilization

Group	Early mobilization	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	1-3	14	31.111	31.111	31.111
	4-7	18	40.000	40.000	71.111
	8-10	13	28.889	28.889	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	1-3	22	48.889	48.889	48.889
	4-7	14	31.111	31.111	80.000
	8-10	9	20.000	20.000	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Early mobilization	**RRRM**	**LRM**	**Total**
1-3	14	22	36
4-7	18	14	32
8-10	13	9	22
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X^2	3.005	2.	0.223
N	90		

Frequencies for late mobilization

Group	Dose of analgetics	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	Metamizole <7.5g	9	20.000	20.000	20.000
	Metamizole >7.5g	21	46.667	46.667	66.667
	Piritramide 22.5mg	15	33.333	33.333	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	Metamizole <7.5g	15	33.333	33.333	33.333
	Metamizole >7.5g	21	46.667	46.667	80.000
	Piritramide 22.5mg	9	20.000	20.000	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Late mobilization	**RRRM**	**LRM**	**Total**
Metamizole <7.5g	9	15	24
Metamizole >7.5g	21	21	42
Piritramide 22.5mg	15	9	24
Total	45	45	90

Chi-Squared Tests

	Value	df	p
X^2	3.000	2	0.223
N	90		

Table 9: *Frequency table for length of hospital stay in both groups with contingency table and chi-squared result for both groups*

Frequencies for hosp. stay

Group	Hosp. stay	Frequency	Percent	Valid Percent	Cumulative Percent
Rutkow-Robbins	1	24	53.333	53.333	53.333
	2	18	40.000	40.000	93.333
	3	3	6.667	6.667	100.000
	Missing	0	0.000		
	Total	45	100.000		
Lichtenstein	1	34	75.556	75.556	75.556
	2	9	20.000	20.000	95.556
	3	2	4.444	4.444	100.000
	Missing	0	0.000		
	Total	45	100.000		

Contingency Tables

	Group		
Hosp. stay	**RRRM**	**LRM**	**Total**
1	24	34	58
2	18	9	27
3	3	2	5
Total	45	45	90

group were hospitalised for 1, 2, and for 4 d compared to 24 (53.3%), 18 (40%), and three patients (6.7%) in the RRRM group for 1, 2, and 3 d, respectively (Table 9). There was no statistically significant difference in the frequency of postoperative complications, such as urine retention, bleeding in the first 24 h, bleeding > 24 h after the procedure, scrotal hematoma, wound and implant infections, mobility up to 24 h after the procedure, postoperative pain, the amount of analgesics consumed, testicular atrophy, length of hospitalisation, and hernia recurrence during the 24-month follow-up period, between the LRM and RRRM groups ($P > 0.005$). There was a noted difference in the BMI between the two groups. The RRRM with mesh and plug was shown to have no advantages compared to the LRM with mesh only with respect to the incidence of postoperative complications.

DISCUSSION

A low recurrence rate, a lack of pain, and a low frequency of postoperative complications are indicative of a successful hernia repair. Historically, hernias have been repaired using a tension method, which has been shown to be ineffective. Currently, all hernia repairs are performed using various tension-free methods. The most advanced method is a posterior repair done laparoscopically or robotically but the most common repair involves an open anterior repair method (1). The LRM, named after an American surgeon (Irving L. Lichtenstein), was developed in 1986 and soon became the standard for inguinal hernia repairs because of the lower recurrence rate. The LRM involves placing a mesh between the inguinal region and the aponeurosis of the obliquus externus muscle and eliminates the need for tension sutures (2). Various other tension-free

methods were subsequently developed. The RRRM is similar to the LRM but has the added element of placing and suturing a mesh plug into the actual defect, which adds an extra layer of reinforcement to prevent recurrence (3). In our retrospective study the incidence of postoperative outcomes was compared between the two types of hernia repair methods. Prior studies comparing these specific hernia repair methods are limited but concluded there was no difference between the methods in terms of outcomes but the operative time for the RRRM was less than the LRM (8, 9). A similar result was reported by Singh et al. (10) with no difference in outcomes but a shorter operative time in favour of RRRM. Meta-analyses have also shown no significant differences between the LRM and RRRM (11-13). The current study showed no difference in the postoperative outcomes but also revealed no significant difference in the length of the operation, and in fact showed an overall shorter time in the LRM group (Table 1, Figure 4). The duration of hospitalisation was comparable in both groups in the current study as well as other studies (Table 9) (14-16). The most important postoperative complication after an open anterior mesh repair is chronic pain. The occurrence rate is between 1% and 31% and has a direct impact on the quality of life. The main causes of persistent pain following a hernioplasty are mechanical triggers (specifically, trauma to the surrounding nerves and internal scarring) (1, 10, 16, 17). The severity of chronic pain after a hernioplasty varies between studies. None of the patients in the current study complained of chronic pain during follow-up evaluations. In fact, there was no significant difference in pain and usage of analgesics postoperatively but there was a trend in favour of LRM (Table 7). Early mobilisation was another parameter evaluated in the current study as an indicator of good hernia repair. No significant differences existed between the two groups with respect to early and late mobilisation (Table 8). Several other parameters were noted in the current study, including urinary retention, early and late bleeding, wound and implant infections or seromas, scrotal hematomas, and testicular atrophy but no significant differences were detected (Tables 3-6). It is also worth noting that there were no hernia recurrences during the follow-up period.

Antibiotic prophylaxis was shown to be an effective method in preventing surgical site infections and was used in all patients in the current study (19).

The current literature shows that a laparoscopic approach is superior to the LRM and RRRM. However, an open anterior repair, such as the LRM, is expected to retain a role in hernia treatment because the LRM is a low-cost and simpler procedure that does not require special equipment and has a shorter learning period with the added bonus of being able to be performed using local and/or regional anaesthesia (20-22). Some studies have shown an advantage for the RRRM with respect to operative and learning times. Indeed, the RRRM is simpler because less dissection is required compared to the LRM but this was not noted in the current study. However, this specific parameter cannot be assessed because all of the operations were performed by the same surgeon (4, 9, 17).

Various postoperative outcomes were compared between the LRM and RRRM hernioplasties in the current study. As reported by other researchers, no significant differences were detected between the LRM and RRRM hernioplasties. Therefore, no advantages with respect to postoperative outcomes were apparent between the two hernia repair methods. Because both hernia repair methods offer similar results, a slight advantage is given to the LRM because the LRM is the more cost-effective method. As methods for hernioplasty evolve, so do the techniques. The LRM has also evolved over time with new modifications and recommendations (23, 24).

CONCLUSION

To summarize, the current study compared the postoperative outcomes in male patients with unilateral inguinal hernias who underwent an elective LRM or RRRM hernioplasty. Both hernia repair methods were equally effective. Studies comparing these two hernia repair methods are limited with most of the studies reporting no significant differences between the two methods. The current study also showed no significant difference in postoperative

outcomes and recurrence rates between the LRM and RRRM. We conclude that both methods are safe and effective with a possible slight advantage going to the LRM solely due to cost.

CONFLICT OF INTEREST

The author declares no conflicts of interest.

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