

# Factors influencing recurrence in inguinal herniorrhaphy

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## Abstract

**Aim:** Inguinal herniorrhaphy is one of the operations made primarily in general surgery clinics. Here, factors influencing recurrence for patients on whom Lichtenstein tension free herniorrhaphy (LTFH) was administered in inguinal hernia surgery in our clinic were investigated.

**Material and Methods:** From file records and operating room reports of patients on whom LTFH was administered with the diagnosis of inguinal hernia between May, 2012 and August, 2015. Age, gender, whether they were operated under emergency/elective conditions or not, body mass index (bmi), primary/recurrence conditions, direct/indirect/ pantaloan hernia typing, length of follow-up, recurrence rates, existence of scrotal component and calibre of internal ring were recorded. They were followed-up from 30 to 60 months. They were divided into two groups as the ones for whom recurrence was observed and not observed.

**Results:** The recurrence was observed in 16 patients in their 46 (30-60) month- period of follow-up. It was determined that high values of body mass index influenced recurrence risk significantly ( $p<0.001$ ). In patients operated under emergency/ elective conditions, no difference was determined between recurrence risks ( $p:0.105$ ). When the common effect of the parameters examined, it was determined that BMI ( $p<0.001$ ), width of internal ring calibr ( $p:0.002$ ) and existence of direct hernia ( $p:0.002$ ) increased risk of recurrence development independently of all other factors.

**Conclusion:** It was determined that risk of recurrence had increased in patients with wide internal ring caliber and scrotal component, high BMI and who were especially operated because of recurrent inguinal hernia in follow-up periods following 48 months.

**Keywords:** Inguinal Hernia; Recurrence; Lichtenstein Tension Free Herniorrhaphy.

## INTRODUCTION

Inguinal hernia is general name of inguinal and femoral region hernias. Inguinal hernia is seen in nearly %3-8 of population (1). %75-85 of hernias is seen in males. Inguinal hernias constitute %80-83 of all hernias. The most frequently seen hernia type in females and males is indirect inguinal hernia. Femoral hernia is seen more frequently in females (1-2). Inguinal herniorrhaphy which had started with Bassini continued with Shouldice and Stoppa repairs and it has been going on with Lichtenstein tension free herniorrhaphy which has been accepted as the most popular technique because it is easily applicable and has acceptably low recurrence rates for the last ten years.

These possible developing recurrence cases have caused morbidity which ends up with complication for patients, extended length of hospital stay and cost increase. In this study, we aimed to reveal the factors causing recurrence in patients on whom LTFH was performed in surgery of inguinal hernia.

## MATERIAL and METHODS

Files of 291 operated patients over 18 who had the diagnosis of inguinal hernia by applying in accordance with Helsinki Declaration Criteria to Clinic of General Surgery and emergency at Kafkas University Faculty of Medicine between May, 2012-August, 2015 because of complaints of inguinal pain and swelling were scanned retrospectively after ethics committee approval had been received.

From patients' file records and operating room reports, age, gender, information about whether they were operated under emergency/elective conditions or not, body mass index, whether they had primary or recurrent hernia, direct / indirect /pantaloan hernia typing, follow-up, recurrence rates, existence of scrotal component and internal ring diameter were recorded. Totally 58 patients who had diseases such as collagen tissue disease ( $n=1$ ), pregnancy history ( $n=2$ ), COPD ( $n=5$ ) which might cause intraabdominal pressure increase, was diagnosed with

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femoral hernia ( $n=2$ ) and were not able to be followed in postoperative period ( $n=48$ ) were excluded from the study and 233 patients were included. 65 years and older patients were accepted as geriatric population. Surgical site cleaning of patients was done with %10 povidone iodine. Incision site hairs of all the patients were shaved via electric shaver in 20 minutes before the operation. While all the patients were administered 1 gr of intravenous (IV) cefazolin sodium prophylaxis in 30 minutes before the operation, 500 mg of ciprofloxacin at 2x1 posology was prescribed at the time of discharge. All the patients were operated with the technique of tension free herniorrhaphy by one surgeon. They were followed up for 30-60 months. Recurrence existence was determined in company with clinical finding and ultrasonographic data by the general surgeon who carried out the operation. 233 patients included into the study were divided into two main groups according to recurrence existence in postoperative period. 217 patients without recurrence constituted Group 1 while 16 patients with recurrence constituted Group 2.

#### Statistical Analysis

Analysis of data was made via SPSS for Windows 22 packaged software. Whether distribution of continuous variables was near-normal or not was examined via Kolmogorov Smirnov Z test. Descriptive statistics were shown as mean  $\pm$ , standard deviation or median (minimum - maximum) for continuous variables although categorical variables were shown as case number and (%). The significance of difference between groups in terms of averages was examined via Student's t test and One-way Anova whereas it was carried out via Mann Whitney U test in terms of median values. Categorical variables were evaluated via chi-square test. The effect of independent factors was calculated through logistic regression analysis. For value of  $P<0.05$ , the results were accepted as statistically significant.

#### FINDINGS

Median value for age of 233 patients included into this study was 51 (18-92) and male/ female ratio was 22.3. In 46 (30-60) month follow-up period of patients, recurrence was observed in 16 patients. Age and gender distribution of patients with recurrence had homogeneous distribution with the ones without recurrence. ( $p:0.689$  and  $p:0.081$ ). Risk of recurrence in follow-up of patients who were operated due to recurrent inguinal hernia was significantly higher than primary inguinal hernia ( $p:0.006$ ). As long as follow-up period with 48,5 month- cut off value was lengthening out, rate of recurrence detection was increasing. ( $p:0.035$ ). When body mass index of patients were examined, it was detected that high BMI values effected risk of recurrence significantly. ( $p<0.001$ ). No difference was determined between risks of recurrence development in patients operated under emergency and elective conditions ( $p:0.105$ ). When intraoperative findings were taken into consideration, it was observed that both existence of scrotal component and an increase in width of internal ring diameter had an effect on recurrence

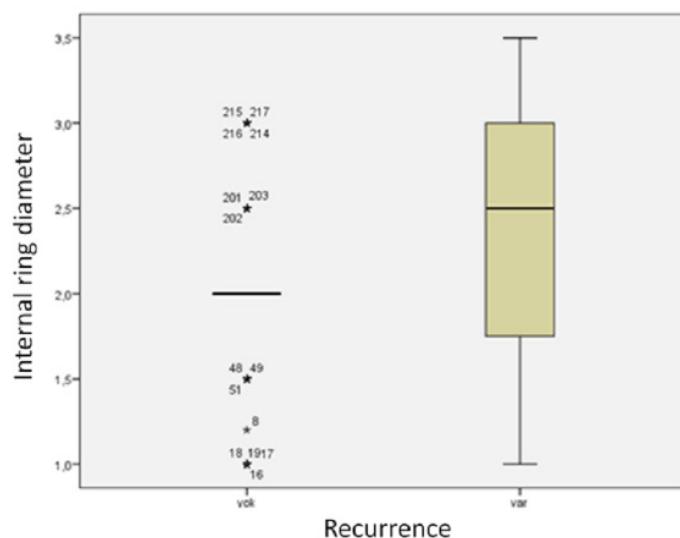
development ( $p:0.005$  and  $p:0.007$ ). It was determined that risk of recurrence development in patients operated because of direct hernia was more. ( $p<0.001$ ). (Table 1).

**Table 1. Analysis of statistical data between groups**

Parameters	Existence of Recurrence			P value
	Non-recurrent group	Recurrent group		
Age	52 (18-92)	43.5 (24-77)	p:0.081	51 (18-92)
Gender (F/M)	9/208	1/15	p:0.689	10/223
Type of Hernia	Primary Recurrence	209	13	<b>p:0.006</b>
		8	3	222
BMI (kg/m <sup>2</sup> )	25.1±2.85	29.5±3.47	<b>P&lt;0.001</b>	25.4±3.10
Follow-up (month)	45 (30-60)	49.5 (38-60)	<b>p:0.035</b>	46 (30-60)
Geriatric patient population	39/178	1/15	p:0.230	40/233
Emergency/elective operation rate	44/173	6/10	p:0.105	50/183
Existence of scrotal component	62/217	10/16	<b>P:0.005</b>	72/233
Internal ring diameter (cm)	2.0 (1-3)	2.5 (1-3.5)	<b>p:0.007</b>	2.0 (1-3.5)
Type of hernia: Direct/indirect/pantalo	26/171/20	9/6/1	<b>P&lt;0.001</b>	35/177/21

BMI: Body mass index, F: Female, M: Male

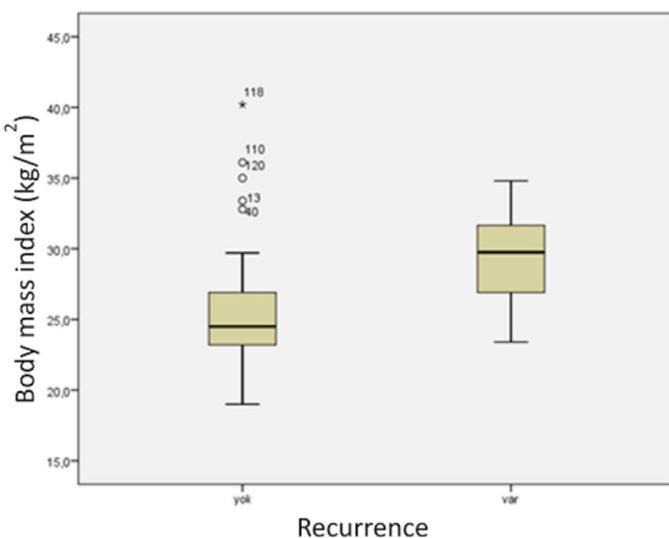
It was observed that internal ring diameter ( $p:0.006$  and Corr. Coef. + 0.178) and increases in BMI ( $p<0.001$  and Corr. Coef. + 0.362) influenced recurrence development with positive correlation (Figure 1).



**Figure 1.** The scatter graph of relation between internal ring diameter and recurrence

When common effect of age, gender, hernia type (primary / recurrent), BMI, emergency / elective conditions, existence of scrotal component, internal ring diameter, follow-up and starting point of hernia (direct / indirect/pantalo hernia) on recurrence development was viewed, it was

ascertained that BMI ( $p<0.001$ ), width of internal ring diameter ( $p:0.002$ ) and existence of direct hernia ( $p:0.002$ ) increased risk of recurrence development independently of all other factors (Figure 2).



**Figure 2.** The scatter graph of relation between body mass index and recurrence

## DISCUSSION

Inguinal hernias is one of operation types for which general surgery carries out elective surgery the most frequently. The main reason of development of new techniques in inguinal herniorrhaphy is to decrease recurrence development in hernia repair. After inguinal herniorrhaphy, the factors increasing risk of recurrence contains the ones related with patients, technical factors and surgical skill of a surgeon. In addition to these, the existence of any factors retarding wound healing also contributes to recurrence development. Smoking, atherosclerosis, obesity, diabetes and advanced age may be regarded as some of patient-related factors increasing recurrence in inguinal herniorrhaphy (3). Although inguinal herniorrhaphy is carried out prevalently, inexpertness of surgeon is viewed as a risk factor in terms of recurrence development in both laparoscopic and conventional inguinal herniorrhaphy (4). LTFH repair which is one of conventional methods is carried out securely in both primary and recurrent cases. LTFH technique has decreased duration of hospital stay, postoperative pain level, start-up time in early period, recurrence rate and cost considerably. Since this technique was put into practice, it has been carried out by lots of surgeons in the world successfully (5). In a 26304-case series published by Nielsen et al. in 2001, application rating of LTFH technique was reported as % 33 in 1998, %62 in 2000 (6). It is known that recurrence rate of inguinal hernia is %0.5 - %10,0 after primary inguinal herniorrhaphy (7). We consider that the reason of many recurrences in our cases is that our hospital is tertiary healthcare organization in the region and our patients are composed of the ones operated not only under elective conditions but also emergency. In a prospective Cohort study conducted by Çalışkan et al. where darn (Moloney)

and Lichtenstein inguinal herniorrhaphy were carried out, it was seen that recurrence rates had been lower in LTFH technique (8). In a prospective randomized multicenter study published in 2006, it was emphasized that it had to be waited for minimum two years in case of possibility of recurrence after Lichtenstein repair (9). In our study, average follow-up was 49.5 month in the group where recurrence was determined and follow-up period was more than recommended minimum follow-up. Recurrence rate is under %1 in hernia centers, for example, Lichtenstein institute of hernia where high volume patient population reside (10). In their study, Cheong et al. reported that recurrence rate was %4.2 in patients whose BMI was  $\geq 23$   $\text{kg}/\text{m}^2$  (11). In our series, it was observed that as long as BMI was coming up  $29.5 \text{ kg}/\text{m}^2$ , recurrence rate was

increasing. In inguinal hernias, that intra-abdominal organs progress to scrotum by passing partially through inguinal canal and volume of hernia bladder increase have extended recurrence rates in proportion to wide internal ring diameter. In inguinal hernias, recurrence incidence of femoral and pantaloan inguinal hernia is higher than other types of hernias. It was determined in our study that risk of recurrence development was more in our patients who were operated due to direct hernia and whose recurrent inguinal hernia repair was carried out.

That our study was designed retrospectively and it had few numbers of cases may be regarded as limitations. On the other hand, strength of our study is that operations of inguinal hernia was performed via LTFH technique by one surgeon working in the same center for long years and diagnosis of recurrence was made through physical examination and ultrasonography in postoperative follow-up carried out by the same doctor. Getting information of follow-up from the patient on the telephone is not based on objective criteria and there may be %50 misinformation (12).

## CONCLUSION

In our study, we concluded that increased internal ring diameter and existence of scrotal component increased risk of recurrence which belonged to patients with high BMI and operated due to especially recurrent inguinal hernia in their follow-up after 48 months.

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