

## Risk Factors for Recurrent Inguinal Hernia Nüks Inguinal Hernide Risk Faktorleri

This article was published in the following Scient Open Access Journal:

Journal of General Surgery

Received December 10, 2018; Accepted January 03, 2019; Published January 10, 2019

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### Abstract

**Aim:** Recurrences in inguinal hernia is not so rare. Therefore identifying factors that have possible role in recurrences of inguinal hernia is very important. In this study, we report the cases operated due to recurrent inguinal hernia in our clinic and aimed to explore patient-related risk factors for recurrent inguinal hernia.

**Methods:** Between July 2013 and July 2015, medical files of a total of 60 patients who were operated due to recurrent inguinal hernia at a tertiary university hospital were retrospectively reviewed.

**Results:** All of our patients were males. The mean age was 54.97 (Std d. 17.23) years. The mean time to recurrence was 5.5 (Std d. 3.56) years. While hernia was on left side in 27 cases, it was in right in 31 cases and in 2 cases hernia was bilateral ( $p=0.679$ ). Hernia type was indirect inguinal hernia in 27 patients, direct inguinal hernia in 32 patients, and femoral hernia in one patient ( $p=0.603$ ). A surgical mesh was used in previous surgery in 18 patients, while no mesh was used in 42 patients. ( $p=0.003$ )

**Conclusion:** Our study unlike the literature all of our cases were male and results suggest that patient-related factors such as age, and localization and type of the hernia do not affect the recurrence, while using surgical mesh, which is common in hernia repair, can reduce the recurrence rate. However, further large-scale studies are required to confirm these findings.

**Keywords:** Inguinal hernia, Recurrence, Risk factors, Recurrence inguinal hernia.

### Introduction

Inguinal region is the most common site where hernias occur and repairing these hernias is the most frequent surgical procedure in both children and adult [1].

Recurrences, bleeding in surgical field, infections, seromas, chronic pain in groin region, pain-related sexual dysfunction, and ejaculatory disorders are the most common complications of inguinal hernia surgery [2]. In the literature, operation for recurrent hernias has been reported to have a higher risk for possible complications than primary hernia surgery [3]. Although the definite causes of recurrence after surgery still remains unclear, controllable technical risk factors such as surgical methods, anesthesia techniques, mesh-fixation techniques, surgeon experience and hospital volume have been described as the main risk factors for recurrent inguinal hernia [4]. In addition, uncontrollable patient-related risk factors including sex, hernia anatomy, hernia type and postoperative recovery have been shown to affect the risk of recurrence following inguinal hernia surgery in varying degrees [5].

In the present study, we report the cases operated due to recurrent inguinal hernia in our clinic and discuss risk factors for recurrent inguinal hernia.

### Materials and Methods

#### Patient Population

This study included a total of 60 patients who were operated due to recurrent inguinal hernia at a university hospital between July 2013 and July 2015. Medical records of all patients were retrospectively analyzed. Patients with primary inguinal hernia, patients younger than 18 years of age, and those with abdominal hernia (i.e., umbilical, epigastric, or incisional) outside the inguinal region were excluded from the study. Data including demographic characteristics of the patients, time from previous

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surgery, localization and type of hernia, and the use of surgical meshes in previous surgery were recorded.

A written informed consent was obtained from each patient. The study was approved by the local Ethics Committee and conducted in accordance with the principles of the Declaration of Helsinki.

### Statistical Analysis

Statistical analysis was performed using the SPSS version 21.0 software (IBM Corp., Armonk, NY, USA). After checking for normality assumptions by normality test (Kolmogorov-Smirnov test or Shapiro-Wilk test where appropriate) descriptive statistics for continuous variables were expressed in mean and standard deviation (SD), and minimum and maximum values; while categorical variables were expressed in number and percent. The relationship between categorical variables was analyzed using the chi-square test or Z-rate. A p value of <0.05 was considered statistically significant.

### Results

Of 60 patients, all were males with a mean age of 54.97 (21 - 90) years. All patients previously had been operated by open technique. Most of the recurrences were in the fifth and sixth decade of life. A total of 53 patients (88.3%) had the first recurrence, while 7 patients (11.7%) had the second recurrence. All patients complained of swelling in the operation area, while 12 of the patients (20%) additionally reported pain. The mean time to recurrence was 5.5 years (4 months-15 years), Majority of recurrences were developed (55%) in first five years after initial operation". In 27 patients (45.0%), hernia was on the left side, while it was on the right side in 31 patients (51.7%). Two patients (3.3%) had bilateral hernia. Localization (right/left) had no statistically significant effect on recurrence ( $p=0.679$ ). Hernia type was indirect inguinal hernia in 27 patients (45%), direct inguinal hernia in 32 patients (53.3%), and femoral hernia in one patient (1.7%). Hernia type (direct/indirect) did not statistically significantly affect the recurrence rates ( $p=0.603$ ). A surgical mesh was used in previous surgery in 18 patients (30%), while no mesh was used in 42 patients (70%). The use of a surgical mesh in the previous surgery was found to statistically significantly reduce the recurrence rate ( $p=0.003$ ).

### Discussion

Despite all developments in patients' care and treatment modalities, recurrence after inguinal hernia surgery still remains a clinical problem. In the literature, up to 13% of all inguinal hernia procedures are being performed for recurrent hernias [6].

Although excellent results have been reported with inguinal hernia surgery, it is not always successful. When compared to other hernia repair techniques, tension-free mesh repair has a lower recurrence rate [7] On the other hand, the increasing use of mesh has not eliminated this problem completely. The Swedish Hernia Register has reported that the number of operations for recurrence has not declined below 16 to 17%, despite the use of mesh repairs [8]. In addition, the true recurrence may be much higher in patients with asymptomatic recurrence or those who simply refuse a redo surgery [9]. In our series, the incidence of recurrent inguinal hernia was 12.9%.

Furthermore, very recurrent hernias may remain silent for a very long time. The most common symptom is a lump or swelling in the operation site with or without pain. Although rare, life-threatening complications such as obstruction and strangulation of the entrapped gut can be also seen [10]. In a Dutch study, 15 of 336 patients (4%) had recurrent inguinal hernia, and a lump in the repaired area was the most common mode of presentation [9].

Although this study mainly focused on the non-technical risk factors for recurrent inguinal hernia, technical surgical aspects should be still addressed.

In a meta-analysis of Burchart J. et al. [11] examining 40 observational studies, several factors including sex, hernia type, hernia size, re-recurrence, bilaterally, mode of admission, age, and smoking were investigated. The authors reported that female sex was a risk factor for recurrent inguinal hernia surgery. However, in our study, different from the literature all patients were males. We think that this result is due to our primary cases 90% were males.

Although age is defined as an absolute risk factor for recurrent inguinal hernia, Ruhl and Everhart [12] reported increased cumulative incidence of recurrent inguinal hernia among men by 7.3% at age 24 to 39 years, 14.8% at age 40 to 59 years, and 22.8% at age 60 to 74 years. Consistent with these findings, we also found that recurrence rates were higher in the fifth and sixth decades, although it did not reach statistical significance. This increase can be explained by an age-dependent decrease in tumor necrosis factor-induced proliferation and in production of interleukins by fibroblasts, both of which diminish immune response and wound healing-related aging [13]. In another study, Ashcroft et al. [14] showed an age-related increase in the matrix metalloproteinase 2 and 9 immunostaining in normal skin and acute cutaneous wounds, predisposing the patient to tissue breakdown conditions. Meyer et al. [15] also reported age-dependent alterations in the hyaluronan in human skin.

According to the localization of the hernia, no consensus has been reached upon, yet. In a study including 293 patients, Junge et al. [16] reported right-sided hernia in 56.7% of the patients. Similarly, in our study, 51.7% of the patients had right-sided, 45% of the patients had left-sided hernia, while 3.3% had bilateral disease. Based on our study results, we found no significant effect of the localization of the hernia on recurrence rates.

According to the type of hernia, 53.3% of our patients had direct and 45% of our patients had indirect inguinal hernia. Consistent with our study findings, Morrison and Jacobs [17] also reported that 54.4% of the patients had direct hernias, while 45.5% had indirect hernias. Although direct type was more common in our study consistent with the literature, the type of the hernia did not significantly affect the recurrence rates.

The majority of surgeons used open mesh repair as standard for primary inguinal hernia. There is clear evidence suggesting that using open technique is associated with a reduced risk for recurrence [18]. In our study, a surgical mesh was used in only 18 patients (30%). We also found that the recurrence rate was statistically significantly lower in these patients, consistent with the literature findings.

Nonetheless, the retrospective design and small sample size are the main limitations to the present study.

In conclusion, inguinal hernias recur due to their multifactorial etiology and several technical and non-technical patient-related risk factors. Our study results suggest that patient-related factors such as age, and localization and type of the hernia do not affect the recurrence, while all patients male and using surgical mesh, which is common in hernia repair, can reduce the recurrence rate. However, further large-scale and comprehensive studies are required to confirm these findings.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

#### Original Article

The paper is not based on a previous communication to a society or meeting

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