



Factors Determining Early Period Outcomes in Geriatric Patients Receiving Inguinal Hernia Repair

Kasık Fıtığı Onarımı Yapılan Geriatrik Hastalarda Erken Dönem Sonuçları Belirleyen Faktörler

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ABSTRACT

Aim: This study is aimed to evaluate the relationship between early period outcomes and clinical features in geriatric patients who were operated on for an inguinal hernia.

Material and Method: Geriatric age patients who were operated on due to an inguinal hernia at a tertiary health centre between 2010 and 2020 were searched retrospectively. Patients aged 65 and over were included in the study, while patients under 65 were excluded. After the clinical features of the patients were collected, the effects of clinical features on the early results were investigated with Chi-Square Test and Likelihood ratio test, assuming that the p value was below 0.05 as significant.

Results: One hundred and fifty-one patients were included in this study. The mean age of the patients was 71.99±5.74 years (range from 65 to 94), and 137 (90.7%) were men. Overall morbidity increased only in emergency surgery (p=0.018), and its rate was 13.2%. The haematoma rate increased in emergency surgery (p=0.001) and the patients with bilateral-side hernias (p=0.019). However, surgical site infection decreased with the presence of comorbid disease (p=0.040). On the other hand, ileus and rare complications were not affected by any clinical factors.

Conclusion: In patients diagnosed with an inguinal hernia at old age, elective surgery should be planned to reduce the overall morbidity, regardless of surgery type, anaesthesia method, and hernia localisation.

Keywords: Emergency, morbidity, hematoma, ileus, surgical site infection

ÖZ

Amaç: Bu çalışmada kasık fıtığı nedeniyle ameliyat edilen geriatrik hastalarda erken dönem sonuçlar ile klinik özellikler arasındaki ilişkinin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: 2010-2020 yılları arasında üçüncü basamak bir sağlık merkezinde kasık fıtığı nedeniyle ameliyat edilen geriatrik yaşta hastalar geriye dönük olarak tarandı. 65 yaş ve üstü hastalar çalışmaya dahil edilirken, 65 yaş altı hastalar çalışma dışı bırakıldı. Hastaların klinik özellikleri toplandıktan sonra, p değerinin 0,05'in altında olduğu anlamlı varsayılarak, klinik özelliklerin erken sonuçlara etkisi Ki-Kare Testi ve Olabilirlik oranı testi ile araştırıldı.

Bulgular: Bu çalışmaya yüz elli bir hasta dahil edildi. Hastaların yaş ortalaması 71,99±5,74 yıl (65-94 yaş arası) ve 137'si (%90,7) erkekti. Genel morbidite sadece acil cerrahide arttı (p=0,018) ve oranı %13,2 idi. Acil cerrahide (p=0,001) ve bilateral yan fıtığı olan hastalarda (p=0,019) hematoma oranı arttı. Ancak komorbid hastalık varlığı ile cerrahi alan enfeksiyonu azaldı (p=0,040). Diğer yandan ileus ve nadir görülen komplikasyonlar herhangi bir klinik faktörden etkilenmedi.

Sonuç: İleri yaşta kasık fıtığı tanısı konan hastalarda, ameliyat tipi, anestezi yöntemi ve fıtık lokalizasyonu ne olursa olsun genel morbiditeyi azaltmak için elektif cerrahi planlanmalıdır.

Anahtar Kelimeler: Acil, morbidite, hematoma, ileus, cerrahi alan enfeksiyonu

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INTRODUCTION

The population of geriatric patients is increasing globally. An increase in age likely raises the prevalence of some specific surgical diseases among this subset of patients. One such disease is an inguinal hernia. The incidence of inguinal hernia increases with age, and the median age at diagnosis is 40-59 years (1). On the other hand, the incidence of inguinal hernia is approximately 110 per 100,000 individuals aged 16-24 to 2000 per 100,000 persons aged 75 years or above in men (2).

Comorbidities are frequent companions of elderly patients requiring surgery (3). Reluctance for operation leads to complications at some stage. Many studies have pointed out that mortality and morbidity increase many folds if such hernias are operated on in emergency in elderly patients (4). Patients present with giant hernias and only seek medical advice when they develop some life-threatening complication. Comorbidities coupled with complications and emergency surgery increase the lifetime risk many folds (5).

The morbidity rate after inguinal hernia operations varies in a wide range between 1-14% in the literature (6). In addition, with ageing, the bowel resection rate increases in inguinal hernias. In addition, the length of hospital stay also increases due to resection. Therefore, early outcomes (morbidity and mortality) increase.

This study evaluated the relationship between early outcomes and clinical factors in geriatric patients who were operated on for an inguinal hernia.

MATERIAL AND METHOD

The study was carried out with the permission of Erzurum Regional Education and Research Hospital Non-invasive Clinical Research Ethics Committee (Date: 01.03.2021, Decision No: 2021/05-113), this retrospective study included patients 65 and older obtaining inguinal hernia repair over ten years (between 2010 and 2020). Patients under 65 years of age and upper 65 years old who were operated on for an inguinal hernia at an external centre and then referred to our hospital for follow-up were excluded from the study. During the research period, 191 patients were operated on for an inguinal hernia. But 40 patients were excluded due to lack of data, and 151 patients were included in the study.

Patients' demographic data (age and gender of the patients), comorbidities, preoperative hernia recurrence, diagnosis methods, surgical urgency, hernia side, anaesthesia type, surgery type, operative technical factors (prosthetic material use, organ resection, spermatic cord lipoma excision, and drainage catheter insertion), and length of hospital stay were investigated parameters. Early outcomes were defined as complications and mortality detected within the first 30 days after surgery. Since there

was no mortality, the relationship between preoperative and intraoperative factors and mortality could not be evaluated. After collecting data from all patients, the effect of the collected parameters on morbidity was investigated.

Statistical analyses were performed using the IBM Statistical Analyses for Social Sciences (SPSS) ver. 22.0 for Windows. The data were given as mean, standard deviation, frequency and percentage. In addition, the Chi-Square and Likelihood ratio tests were used to compare variables. A p value below 0.05 was considered statistically significant.

RESULTS

Of 151 patients, 137 (90.7%) were men, and the mean age of all patients was 71.99 ± 5.74 years (range from 65 to 94). One hundred and one (66.9%) patients had at least one comorbid disease, and the most common was a cardiac disease, with a rate of 30.5%. 8 (5.3%) patients had a previous hernia surgery. One hundred and thirteen (74.8%) patients were operated on only based on physical examination findings, 30 (19.9%) patients with ultrasonography (USG) confirmation after physical examination, and 8 (5.3%) patients had computed tomography (CT) correlation after physical examination. After evaluation with physical examination and/or USG/CT, the right-sided hernia was found in 93 (61.6%) patients, left-sided hernia in 47 (31.1%) patients, and bilateral hernia in 11 (7.3%) patients. One hundred and seventeen patients (77.5%) were operated on as elective cases.

The most preferred anaesthesia method was spinal anaesthesia in 118 (78.1%) patients. In the patients with a unilateral hernia (n=140), 89 (63.6%) patients had a direct inguinal hernia, 45 (32.1%) patients had an indirect inguinal hernia, and 6 (4.3%) patients had a femoral hernia. One hundred and forty-five (96%) underwent open surgery, and hernia defects of 133 (88.1%) patients were repaired with prosthetic material. A drainage catheter was placed in 41 (27.2%) patients. Fourteen patients had an intra-abdominal organ incarcerated within the hernia sac. Organ resection was performed in only 4 (2.6%) of all patients due to strangulation and unresponsiveness to wait-watch for 30 minutes, small bowel resection in 3 patients and colon resection in one patient. In the remaining ten patients, organ resection was not required. The resection rate at emergency hernia surgeries was 11.7% (4/34).

Most inguinal hernia surgeries (86.8%) were performed without complication, but overall morbidity was 13.2%, with no mortality. The mean hospital stay was 3.83 ± 3.04 days (range from 1 to 20 days). Surgical site infection was seen in 7 (4.6%) patients, hematoma in 7 (4.6%) patients, and ileus in 2 (1.3%) patients. Rare complications were seen in 4 (2.6%) patients; persistent post-herniorrhaphy pain in 2 patients, deep vein thrombosis in one patient, and hydrocele with orchitis in one patient. The clinical factors of the patients are shown in **Table 1**.

Table 1. Clinical factors of the patients.	
Clinical factors	Value or n (%)
Preoperative factors	
Age ^a	71.99±5.74 (65-94)
Gender ^b	
Male	137 (90.7)
Female	14 (9.3)
Comorbidity ^b	
Yes	101 (66.9)
One comorbid disease	62 (41.1)
Cardiac disease	46 (30.5)
Pulmonary disease	8 (5.3)
Urinary disease	7 (4.6)
Endocrinological disease	1 (0.7)
Two or more comorbid disease	39 (25.8)
No	50 (33.1)
Preoperative recurrent hernia ^b	
Yes	8 (5.3)
No	143 (94.7)
Diagnosis method ^b	
PE	113 (74.8)
PE and USG	30 (19.9)
PE and CT	8 (5.3)
Hernia side ^b	
Right	93 (61.6)
Left	47 (31.1)
Bilateral	11 (7.3)
Surgical urgency ^b	
Elective	117 (77.5)
Emergency	34 (22.5)
Intraoperative factors	
Anaesthesia type ^b	
General	29 (19.2)
Spinal	118 (78.1)
Local	4 (2.7)
Type of surgery ^b	
Laparoscopic	6 (4)
Open	145 (96)
Spermatic cord lipoma ^b	
Yes	5 (3.3)
No	146 (96.7)
Drainage catheter ^b	
Yes	41 (27.2)
No	110 (72.8)
Prosthetic material use ^b	
Yes	133 (88.1)
No	18 (11.9)
Organ resection ^b	
Yes	4 (2.6)
No	147 (97.4)
Postoperative factors	
Hospital stays ^a	3.83±3.04 (1-20)
Early outcomes ^b	
Overall morbidity	20 (13.2)
SSI	7 (4.6)
Hematoma	7 (4.6)
Ileus	2 (1.3)
Rare complications	4 (2.6)
Overall mortality	0 (0)

^a: mean ± standard deviation (range), ^b: n (%). PE: Physical examination, USG: Ultrasonography, CT: Computed tomography, SSI: Surgical site infection.

According to the statistical test results, only emergency surgery increased the overall morbidity ($p=0.018$). However, comorbidity interestingly decreased the surgical site infection ($p=0.040$). Postoperative hematoma increased in patients operated under emergency conditions and patients with bilateral inguinal hernia, $p=0.001$ and $p=0.019$, respectively. On the other hand, any clinical factors did not affect ileus and rare complications. The relationship between the clinical characteristics and early outcomes is shown in **Table 2**.

DISCUSSION

Inguinal hernia operations are more common in old than young ones due to the weakening of the connective tissue, increased risk of chronic disease, and increased intra-abdominal pressure (7). There was a male gender dominance of up to 100% in the distribution of hernia cases (8,9). In parallel with the literature, the male-to-female ratio of the present study was 9.78. Comorbid diseases are high in elderly patients and increase the likelihood of complications (5,10). When elderly patients present with complications such as incarceration or strangulation, the morbidity rate is much higher (11). On the other hand, Uğur et al. found no correlation between comorbidity and morbidity (12). The present study also found no correlation between comorbid disease and morbidity (12.9% vs 14%). In the study of Pavlidis et al., inguinal hernia repairs were done due to recurrences in about 1.5% of patients (13). On the other hand, Liem et al. (14) reported 6% postoperative recurrence. In this study, 5.3% of inguinal hernia repairs are done due to recurrences, comparable with the literature.

The morbidity of emergency operations is higher than in elective hernia repairs. Early elective surgery is recommended in elderly patients to avoid morbidity and mortality (15). Uğur et al. found that the elderly patients who were operated on in emergency conditions had higher complications (12). On the other hand, Pavlidis et al. (13) stated that hernia repair is safe and well-tolerated in the elderly. Vatansev et al. (7) concluded in their study that elderly patients diagnosed with a hernia should be operated on under elective conditions as much as possible. In this study, the overall morbidity and hematoma rate were higher in the emergency surgery group. However, emergency surgery did not affect the percentage of surgical site infection, ileus, and other rare complications.

General anaesthesia is usually preferred in the emergency setting, whereas local or loco-regional anaesthesia is the first option for elective hernia repair (15). Several studies suggested that local anaesthesia for hernia repair reduces morbidity by up to 30% (17). Antonio et al. performed inguinal hernia repair under

Table 2. Relationship between clinical factors and early outcomes.

	Overall morbidity (n=20)	p value	SSI (n=7)	p value	Hematoma (n=7)	p value	Ileus (n=2)	p value	Rare (n=4)	p value
Gender		0.400*		0.128*		1.000*		0.177*		1.000*
Male	17 (12.4%)		5 (3.6%)		7 (5.1%)		1 (0.7%)		4 (2.9%)	
Female	3 (21.4%)		2 (14.3%)		0 (0%)		1 (7.1%)		0 (0%)	
Comorbidity		0.847*		0.040*		0.426*		1.000*		1.000*
Yes	13 (12.9%)		2 (2%)		6 (5.9%)		2 (2%)		3 (3%)	
No	7 (14%)		5 (10%)		1 (2%)		0 (0%)		1 (2%)	
Recurrent Hernia		0.286*		0.322*		0.322*		1.000*		1.000*
Yes	2 (25%)		1 (12.5%)		1 (12.5%)		0 (0%)		0 (0%)	
No	18 (12.6%)		6 (4.2%)		6 (4.2%)		2 (1.4%)		4 (2.8%)	
Diagnosis Method		0.580**		0.507**		0.607**		0.150**		0.308**
PE	15 (13.3%)		4 (3.5%)		6 (5.3%)		1 (0.9%)		4 (3.5%)	
PE and USG	3 (10%)		2 (6.7%)		1 (3.3%)		0 (0%)		0 (0%)	
PE and CT	2 (25%)		1 (12.5%)		0 (0%)		1 (12.5%)		0 (0%)	
Surgical Emergency		0.018*		0.655*		0.001*		0.401*		0.575*
Elective	11 (9.4%)		5 (4.3%)		1 (0.9%)		1 (0.9%)		4 (3.4%)	
Emergency	9 (26.5%)		2 (5.9%)		6 (17.6%)		1 (2.9%)		0 (0%)	
Hernia Location		0.287**		0.246**		0.019**		0.765**		0.139**
Right	10 (10.8%)		3 (3.2%)		2 (2.2%)		1 (1.1%)		4 (4.3%)	
Left	7 (14.9%)		4 (8.5%)		2 (4.3%)		1 (2.1%)		0 (0%)	
Bilateral	3 (27.3%)		0 (0%)		3 (27.3%)		0 (0%)		0 (0%)	
	Overall Morbidity (n=20)	p value	SSI (n=7)	p value	Hematoma (n=7)	p value	Ileus (n=2)	p value	Rare (n=4)	p value
Anaesthesia Type		0.615**		0.766**		0.085**		0.595**		0.367**
General	5 (17.2%)		1 (3.4%)		3 (10.3%)		1 (3.4%)		0 (0%)	
Spinal	14 (11.9%)		6 (5.1%)		3 (2.5%)		1 (0.8%)		4 (3.4%)	
Local	1 (25%)		0 (0%)		1 (25%)		0 (0%)		0 (0%)	
Type of Surgery		1.000*		1.000*		1.000*		1.000*		1.000*
Laparoscopy	0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
Open	20 (13.8%)		7 (4.8%)		7 (4.8%)		2 (1.4%)		4 (2.8%)	
Spermatic Cord Lipoma		1.000*		1.000*		1.000*		1.000*		1.000*
Yes	0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
No	20 (13.7%)		7 (4.8%)		7 (4.8%)		2 (1.4%)		4 (2.7%)	
Drainage Catheter		0.054*		1.000*		0.087*		0.072*		1.000*
Yes	9 (22%)		2 (4.9%)		4 (9.8%)		2 (4.9%)		1 (2.4%)	
No	11 (10%)		5 (4.5%)		3 (2.7%)		0 (0%)		3 (2.7%)	
Prosthetic Material		0.710*		1.000*		0.597*		0.225*		0.401*
Yes	17 (12.8%)		7 (5.3%)		6 (4.5%)		1 (0.8%)		3 (2.3%)	
No	3 (16.7%)		0 (0%)		1 (5.6%)		1 (5.6%)		1 (5.6%)	
Organ Resection		1.000*		1.000*		1.000*		1.000*		1.000*
Yes	0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
No	20 (13.6%)		7 (4.8%)		7 (4.8%)		2 (1.4%)		4 (2.7%)	

SSI: Surgical Site Infection, PE: Physical Examination, USG: Ultrasonography, CT: Computed Tomography. *Chi-Square test, **Likelihood Ratio test.

local anaesthesia in 454 patients and stated they did not encounter any severe complications (18). In our study, spinal was the type of anaesthesia most frequently used in elderly patients; however, anaesthesia type did not affect morbidity in this study.

Laparoscopic inguinal hernia repair could be performed safely without increasing morbidity in old age. A meta-analysis showed that the laparoscopic approach positively affected local complications and pain-related parameters (19). However, the number of laparoscopically operated patients in the present study is low, and the overall morbidity of the laparoscopic surgery group was 0%. However, the morbidity rate in the open surgery group was 13.8%, comparable to other studies.

In the Cochrane systematic review published in 2018, patients who underwent inguinal hernia repair with mesh had a higher wound infection rate than the non-mesh repair group. However, the hematoma rate in the operation area was lower than in the non-mesh repair group in the mesh group. Also, in the same study, the risk of postoperative wound infection was higher in the mesh repair group, while the risk of postoperative pain was higher non-mesh repair group (19). However, a study (20) emphasised that using mesh in inguinal hernia repair did not increase postoperative morbidity as in this study.

Surgical site infections (SSI) with a 5% prevalence are a rare complication after hernia repair (20). In our study, the prevalence of SSI was 4.6%, a little more than the literature. Postoperative hematoma occurs



between 0.3 and 26% (21). Previous studies examining the causes of postoperative hematomas following inguinal herniorrhaphy have focused on perioperative anticoagulation. This study's relationship between perioperative anticoagulation and morbidity could not be examined due to a lack of information. On the other hand, in our research, the hematoma frequency was higher in emergency surgeries and bilateral cases.

In the study of Lebeau et al., bowel necrosis requiring bowel resection is the factor of unfavourable postoperative results (22). The presence of bowel necrosis modifies the prognosis and the treatment of strangulated inguinal hernia (23). In past studies, the infection rate in inguinal hernia was between 13 and 50 (22,24,25). This study's resection rate was 11.7% lower than the literature. In addition, bowel resection did not increase overall morbidity.

Limitations

There were some limitations in this study. The main limitation was that the presented study was a retrospective study from a single institution and a file-based study. Due to a lack of data, 40 patients have excluded from the study. In addition, anticoagulant use was excluded from the evaluation because reliable data could not be obtained.

CONCLUSION

Emergency inguinal hernia repair increased overall morbidity. However, the presence of comorbidity interestingly decreased the surgical site infection rate. Emergency cases and bilateral cases increased the rate of hematoma. On the other hand, any clinical factors did not affect ileus and rare complications. In patients diagnosed with an inguinal hernia at old age, elective surgery should be planned to reduce the overall morbidity, regardless of surgery type, anaesthesia method, and hernia localisation..

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Erzurum Regional Education and Research Hospital Non-invasive Clinical Research Ethics Committee (Date: 01.03.2021, Decision No: 2021/05-113).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

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