Recep AKTİMUR[1]
Süleyman ÇETİNKÜNAR[2]
Kadir YILDIRIM[1]
Sabri ÖZDAŞ[3]
Sude Hatun AKTİMUR[4]
Elif ÇOLAK[1]
Hakan GÜZEL[5]
Mehmet Derya DEMİRAĞ[6]
Nuraydın ÖZLEM[1]

İletişim *(Correspondance)*

Recep AKTİMUR
Samsun Eğitim ve Araştırma Hastanesi
Genel Cerrahi Kliniği, Samsun

Tlf: 0545 668 02 01
e-posta: recepaktimur@gmail.com

[1] Samsun Eğitim ve Araştırma Hastanesi Genel Cerrahi, Kliniği SAMSUN
[2] Adana Numune Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniği   ADANA
[3] Adıyaman Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniği   ADIYAMAN
[4] Ondokuz Mayıs Üniversitesi Tıp Fakültesi Hematoloji Kliniği, İç Hastalıkları SAMSUN
[5] Ankara Dışkapı Yıldırım Beyazıt Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniği   ANKARA
[6] Samsun Eğitim ve Araştırma Hastanesi , Romatoloji Kliniği, İç Hastalıkları SAMSUN

RESEARCH

COMPARISON OF THE OUTCOMES OF WATCHFUL WAITING AND SURGERY IN 80 YEARS OF AGE AND OLDER COMORBID AND MINIMALLY SYMPTOMATIC INGUINAL HERNIA PATIENTS

ABSTRACT

Introduction: With the growing proportion of elderly people in the population, surgeons are dealing with more frail patients. In addition, the prevalence of inguinal hernia increases with age. We aimed to compare the outcomes of watchful waiting and surgery in inguinal hernia patients who were 80 years of age and older had comorbidities and were minimally symptomatic.

Materials and Method: Two high volume, mostly comorbid patient treating tertiary care education hospitals' databases were searched for inguinal hernia patients ≥80 years of age. One hundred and fifty four of the 324 patients treated between April 2010 and April 2014 were included in this study. Demographic characteristics, comorbidities and patient reported outcomes were recorded from the database and telephone calls.

Results: Mean patient age was 83±2.8 years and median follow-up time was 15 months. At diagnosis, 17 (11%) patients chose surgery, 137 patients were observed; of these, 74 (54.1%) crossed over to surgery, 48 (64.8%) elective and 26 (33.2%) emergency. The emergent operation rate for observation group was 18.9%. Crossover was found to be corelated with emergency admission before the diagnosis, increased pain in admission, low American Society of Anesthesiologists score, bowel resection and complications. Four patients were died within 30-days postoperatively, three in emergent and one in elective crossover. Mortality was corelated with heart failure and bowel resection.

Conclusion: Although recommending watchful waiting for 80 years of age and older inguinal hernia patients with comorbidities and minimal symptoms sounds logical, the natural course of these patients is intriguing. Planned herniorrhaphy under local anaesthesia for extremely old and comorbid patients seems more acceptable today.

Key Words: Hernia, Inguinal; Aged; Comorbidity; Observation.

ARAŞTIRMA

SEKSEN YAŞ VE ÜZERİ KOMORBİD VE MİNİMAL SEMPTOMATİK İNGUİNAL HERNİ HASTALARINDA TAKİP İLE OPERASYON SONUÇLARININ KARŞILAŞTIRILMASI

ÖZ

Giriş: Yaşlı popülasyonun artışı ile birlikte cerrahlar disabilite oranı yüksek inguinal herni hastalarıyla daha fazla karşılaşmaya başlamışlardır. Bu çalışmada 80 yaş ve üzeri komorbid ve minimal semptomatik inguinal herni hastalarında takip ile operasyon sonuçlarının karşılaştırılması amaçlanmaktadır.

Gereç ve Yöntem: İki yüksek kapasiteli, çok sayıda komorbid hasta tedavi eden eğitim hastanesinin 80 yaş ve üzeri inguinal herni hastaları tarandı. Nisan 2010 ve Nisan 2014 arasında saptanan 324 hastanın 154'ü çalışmaya dahil edildi. Kayıtlara ve telefon konuşmalarına göre demografik veriler, komorbidite ve hasta tarafından tariflenen sonuçlar kaydedildi.

Bulgular: Ortalama yaş 83±2.8 ve ortanca takip süresi 15 ay olmuştur. Tanı anında 17 (%11.0) hasta operasyonu seçti. 137 takip hastasının 74'ü (%54.1) elektif ya da acil koşullarda opere edildi, 48 (%64.8), 26 (%33.2). Tüm takip grubu için acil operasyon oranı %18.9'du. Operasyona geçiş; tanı öncesi acil başvurusu, başvuruda şiddetli ağrı, düşük Amerikan Anestezistler Derneği skoru, barsak rezeksiyonu ve komplikasyon ile ilişkili idi. Acil operasyon grubunda üç, elektif operasyon grubunda bir hasta postoperatif 30 gün içinde öldü. Mortalite ile kalp yetmezliği, ve barsak rezeksiyonu ilişkili bulundu.

Sonuç: Günlük pratikte 80 yaş ve üzeri komorbid ve minimal semptomatik hastalara takip önermek mantıklı görünse de, bu hastaların doğal seyri düşündürücüdür. Günümüzde, ileri derecede yaşlı ve komorbid hastalar için lokal anestezi altında planlı herniorafi daha makul bir seçenek olarak görünmektedir.

Anahtar Sözcükler: İnguinal Herni; Yaşlı; Komorbidite; Takip.

INTRODUCTION

Inguinal hernia (IH) repair is one of the most commonly performed operations worldwide. With the growing proportion of elderly people in the population, surgeons are dealing with a larger number of older and more frail patients. Compounding the growing elderly population, the prevalence of IH increases with age. The overall IH rate for people aged over 75 has been found to be as high as 29.8% (1). Many of these patients are asymptomatic or minimally symptomatic. Although the reported outcome of IH repair is mostly uneventful in all age groups, recommending an operation to this group is hard for surgeons. From the surgeon's side, it has been shown that the geriatric population has an increased morbidity and mortality rate after surgery (2). In addition, patients and relatives generally hesitate in the face of the surgical risks and refuse surgery. Despite the classical treatment recommendation for IHs, sometimes surgeons and patients delay hernia repair. On the other hand, when an incarceration or strangulation occurs, bowel resection and overall mortality rate increase to 19% and 5%, respectively (3). Therefore, an emergent hernia repair could change an elective and uneventful surgery to a mortality, especially in older and comorbid patients. Some recent randomized clinical trials have shown that watchful waiting is safe in minimally symptomatic men, but this approach is not justified for patients over 80 years of age, and for more comorbid patients (4,5). These patients are generally more frail than previously studied groups, and the expected outcome of an emergent surgery is more complicated.

We conducted a retrospective clinical study in mostly comorbid patients treated in two high-volume tertiary care education hospitals to compare the outcomes of watchful waiting and operation in IH patients who were ≥80 years old, comorbid and minimally symptomatic.

MATERIALS AND METHOD

Patient Selection

Two high-volume, mostly comorbid patient treating tertiary care education hospitals' databases were searched for 80 years of age and older IH patients (search ICD-10 codes were as follows: K40.0, K40.1, K40.2, K40.3, K40.4, K40.9). After the local ethics committee approval (SEAH-2014/21), 324 patient records dating from April 2010 to April 2014 were evaluated retrospectively. The IH diagnosis and recommended treatment options were confirmed from the surgeons' physical examination notes in the hospitals' database systems. Incomplete examination notes or treatment recommendation in the data-

base were considered as exclusion criteria. Thirty two patients with recurrent IHs, 105 patients with incomplete data and unreachable telephone numbers and 33 patients with inconsistent answers during telephone calls were excluded. All telephone calls were made by two investigators. Patients and first-degree relatives who were living with them were considered accepable respondents in telephone conversations. For the first question, the respondent was asked which side the hernia was on; incorrect answers for this question were a further exclusion criterion. Patients' ASA scores were taken from the preoperative examination form from the Anesthesiology Clinics. Demographic characteristics, hernia types (according to Nyhus classification), comorbidities and patient-reported outcomes were recorded.

Study Design

A total of 154 patients were divided in four groups, operation (O), watchful waiting (WW), elective crossover (WW/ELC) and emergency crossover (WW/EMC); the groups had 17, 63, 48 and 26 patients, respectively. The need for an operation in the watchful waiting group during the follow-up time was considered a crossover, and patients who crossed to the operation arm were grouped seperately, according to whether the operation was elective or emergency (WW/ELC or WW/EMC). The watchful waiting group in this study consisted of patients who were followed non-operatively during the whole follow-up time. In the operation group, all patients underwent an open inguinal herniorrhaphy with mesh placement using the Lichtenstein technique. All operations were performed under spinal or general anaesthesia.

Demographics, hernia type, commonly encountered comorbidities, ASA scores, outcomes of operations, length of hospital stay, patient reported outcomes and disease related mortality were compared among the four groups. In bilateral hernia patients, dominant side of patient's complaints were taken into account, regarding to hernia type. Excitus in first the 30 days after the operation was considered as disease-related mortality. The primary outcome measures for this study were the crossover rate and crossover-related morbidity and mortality. The secondary outcome measures were the determination of predisposing factors for the crossover, and developing a strategy for treatment recommendations for advanced aged comorbid IH patients and their relatives.

Statistical Analysis

Continuous data were presented as median and range or mean±standard deviation (SD). Dichotomous and categorical data were presented as numbers with percentages. Normally
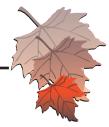
distributed continuous data were assessed with Student's t-Test for comparison of two groups and one-way ANOVA for comparison of three or more groups. If the data were not normally distributed, continuous data were assessed with the Kruskal-Wallis test for overall differences, and secondary analysis was conducted using the Mann-Whitney U test for differences between groups. The Chi square test was used for categorical data. A two-tailed p value of <0.05 was considered statistically significant. Statistical analyses were performed using SPSS, version 16.00 (Chicago, IL, USA).

RESULTS

The mean age was 83±2.8 years and the mean BMI was 24.8±4.6. The median follow-up time was 15 months (0-45 months). Statistically significant difference was found in hernia type in between the groups (p<0.001). In subgroup analysis, we have found significant difference in the presence of Nyhus type IIIA hernia (direct) (74.6%) in WW group when compared to O group (p<0.001). However, hernia type did not differ in WW/ELC and WW/EMC groups when compared to O group (p=0.353 and 0.104 respectively). In the same analysis, we have found significant differences in WW/ELC and WW/EMC groups when compared to WW group (p<0.001 and <0.001 respectively). Also, we have found significant differences in between WW/ELC and WW/EMC groups according to hernia type (p<0.001). Demographic characteristics, hernia types (according to Nyhus classification), comorbidities and ASA scores of the study groups are presented in Table 1.

Of 42 (27.6%, n=154) patients have had at least one emergency department admission before the IH diagnosis. Common complaints were pain and swelling in the inguinal

Table 1— Demographic Characteristics, Hernia Types (According to Nyhus Classification), Comorbidities and ASA Scores of the Study Groups.

	All Patients n=154	Operation n=17	Watchful Waiting n=63	Elective Crossover n=48	Emergency Crossover n=26	Overall p Value
Age, mean±SD	83±2.8	83.1±2.9	82.8±2.6	82.5±2.5	84.2±3.3	0.068
Sex, n (%)						
Male	129 (83.8)	16 (94.1)	52 (82.5)	47 (97.9)	14 (53.8)	<0.001
Female	25 (16.2)	1 (5.9)	11 (17.5)	1 (2.1)	12 (46.2)	
BMI, mean±SD	24.8±4.6	22.7±6.7	25.3±5.2	25±3.4	24.9±3.2	0.249
Hernia side, n (%)						
Right	87 (56.5)	9 (52.9)	33 (52.4)	26 (54.2)	19 (73.1)	
Left	60 (39)	6 (35.3)	28 (44.4)	20 (41.7)	6 (23.1)	0.411
Bilateral	7 (4.5)	2 (11.8)	2 (3.2)	2 (4.2)	1 (3.8)	
Nyhus type, n (%)						
Type I	5 (29.4)	4 (6.3)	5 (10.4)	12 (46.2)	26 (16.9)	
Type II	3 (17.6)	8 (12.7)	11 (22.9)	8 (30.7)	30 (19.5)	<0.001
Type IIIA	3 (17.6)	47 (74.7)	9 (18.8)	-	59 (38.3)	
Type IIIB	6 (15.4)	4 (6.3)	23 (47.9)	6 (23.1)	39 (25.3)	
DM, n (%)	36 (23.5)	3 (17.6)	19 (30.2)	10 (20.8)	4 (16)	0.416
Chronic obstructive pulmoner disease, n (%)	49 (31.8)	6 (35.3)	29 (46)	7 (14.6)	7 (26.9)	0.005
Hearth failure, n (%)	71 (46.1)	3 (17.6)	37 (58.7)	21 (43.8)	10 (38.5)	0.016
Chronic renal failure, n (%)	9 (5.9)	-	7 (11.1)	1 (2.1)	1 (4)	0.201*
ASA grade, n (%)						
Grade I	10 (6.5)	3 (17.6)	2 (3.2)	4 (8.3)	1 (3.8)	0.009*
Grade II	23 (14.9)	3 (17.6)	5 (7.9)	13 (27.1)	2 (7.7)	
Grade III	49 (31.8)	8 (47.1)	19 (30.2)	14 (29.2)	8 (30.8)	
Grade IV	72 (46.8)	3 (17.6)	37 (58.7)	17 (35.4)	15 (57.7)	
Follow-up time, median (min-max)	15 (0-45)	14.5 (2-40)	14 (1-41)	16.5 (0-45)	17 (0-42)	0.502

*Fisher's exact p value.

Table 2— Emergency Department Admission Before the Diagnosis and the Pain Severity at the Diagnosis.

	All Patients n=154	Operation n=17	Watchfu Waiting n=63	Elective Crossover n=48	Emergency Crossover n=26	Overall p Value
Emergency department admission before the diagnosis, n (%)	42 (27.6)	3 (17.6)	10 (16.1)	12 (25.5)	17 (65.4)	<0.001
Pain severity at the diagnosis, n (%)						
Mild	115 (74.7)	9 (52.9)	53 (84.1)	42 (87.5)	11 (42.3)	<0.001
Disturbing	39 (25.3)	8 (47.1)	10 (15.9)	6 (12.5)	15 (57.7)	

area. Emergency department admission before diagnosis and pain severity at diagnosis are shown in Table 2.

At diagnosis, only 17 (11%) of 154 patients chose surgery. 137 patients (89%) were observed, and 74 (54.1%) patients from the observation group crossed over to an operation. In the crossover group, 48 (64.8%) patients were operated electively and 26 (33.2%) patients were operated in emergency settings. The emergent operation rate for whole WW group was 18.9%. Elective and emergent crossover time of the observation group were listed as; first 6 months, 43.8%, 61.5%; second 6 months, 43.8%, 26.9%; and >1 year 12.4%, 11.5% respectively. Crossover time and operation indications for the WW/ELC and WW/EMC groups are presented in Table 3.

Tablo 3— Crossover Time and Operation Indication for WW/ELC and WW/EMC Groups

	Elective Crossover n=48	Emergency Crossover n=26
Crossover time, n (%)		
First 3 months	15 (31.2)	11 (42.3)
3-6 months	6 (12.5)	5 (19.2)
6-12 months	21 (43.8)	7 (26.9)
1-2 years	4 (8.3)	2 (7.7)
2-3 years	2 (4.2)	1 (3.8)
Operation indication, n (%)		
Pain	12 (25.0)	-
Increase of pain	36 (75.0)	1 (3.8)
Incarceration	-	6 (23.1)
Strangulation	-	15 (57.5)
Ileus	-	4 (15.4)

Emergent operation indications and bowel resection were found to be significantly increased in patients, who have high ASA scores (III-IV) (p=0.023 and 0.033 respectively). We have found significant difference in low ASA score in WW/ELC group when compared to WW group (p=0.002). In WW/EMC group we have found significant difference in emergency admission before the diagnosis (p<0.001) and increased pain in admission (p<0.001) when compared to WW group. When we compare postoperative outcomes of O, WW/ELC and WW/EMC groups; in WW/ELC group we have not found any difference, however, in WW/EMC group, we have found significant difference in bowel resection (p=0.001), complication (p=0.010) and postoperative contentment (p<0.001) when compared to O group. Hemorrhage, hematoma, seroma, urinary retention, infection and nerve entrapment were accepted as complications. The overall postoperative complication rate was 13.6%. Hernia-related mortality was seen only in the crossover groups: three patients in WW/EMC group and one patient in WW/ELC group died in first 30 days after the operation. Heart failure and bowel resection ratio were found to be increased significantly in the patients, who were died in first 30 days of operation. Disease-related mortality was not statistically significant in WW/ELC and WW/EMC groups when compared to O group (p=0.999 and 0.266 respectively). In WW/EMC group, bowel resection, postoperative complication and disease-related mortality risk increased 9.2, 4.2 and y5.4 fold, respectively. Patient outcomes according to group are shown in Table 4.

DISCUSSION

This study was primarily intended to uncover the outcomes of watchful waiting for asymptomatic or minimally symptomatic ≥80 year old comorbid IH patients. The watchful

Table 4— Outcomes of the Patients According to the Groups.

	All Patients n=154	Operation n=17	Elective Crossover n=48	Emergency Crossover n=26	Overall p Value
Bowel resection, n (%)	15 (9.7)	1 (5.9)	-	14 (53.8)	<0.001*
Postop. complication, n (%)	21 (13.6)	2 (11.8)	6 (12.5)	13 (50)	0.001
Excitus in first 30 days, n (%)	4 (2.6)	-	1 (2.1)	3 (11.5)	0.107*
Hernia recurrence, n (%)	3 (1.9)	-	2 (4.2)	1 (3.8)	0.296*
Postop. contentment, n (%)					
Minimal	7 (7.7)	-	2 (4.2)	5 (19.2)	<0.001*
Moderate	7 (7.7)	2(11.8)	3 (6.2)	2 (7.7)	
Good	38 (41.8)	5 (29.4)	15 (31.2)	18 (69.2)	
Better	39 (42.9)	10 (58.8)	28 (58.3)	1 (3.8)	

*Fisher's exact p value

waiting concept arose from two randomized clinical trials, which were presented as the first evidence-based data about observation of an asymptomatic or minimally symptomatic IH in men (4,5). Fitzgibbon et al. concluded that watchful waiting of a minimally symptomatic IH is a safe and feasible alternative to open herniorrhaphy because of the rare incarceration rate and no greater risk of operative complications in the crossover group (4). O'Dwyer et al. showed no association between chronic pain and elective repair of an asymptomatic IH (5). They detected a higher rate of crossover than expected and concluded that elective operation may be beneficial to patients in improving overall health and reducing potentially serious morbidity. In the study by Fitzgibbon et al., men 18 years or older with asymptomatic or minimally symptomatic IH were followed up for 2 years, and O'Dwyer et al. studied men 55 years or older and published one year follow-up results. The outcomes of the patients from these trials were separately analysed in different studies for both crossover rate and complications (6–8). However, there are no another studies comparing the outcomes of operation and observation of IH in asymptomatic or minimally symptomatic patients. Further, there are no studies investigating this concept in elderly and comorbid patients. An increasing number of geriatric patients, and their accompanying comorbidities, need to be evaluated in every field of surgery, especially in the most commonly encountered conditions such as inguinal hernias. Therefore, the selected patient population of this study is of utmost importance for appropriate decision-making for both today and tomorrow.

We divided study participants into four groups to facilitate the interpretation of the results, as we already knew the course of the disease in this retrospective analysis. Our median follow-up time was 15 (0-45) months; according to previous trials, this time interval was considered sufficient to reach a conclusion (4,5). Age, BMI, hernia side, presence of DM or chronic renal failure and follow-up time were similar among the four groups. Sex, ASA score and presence of chronic obstructive pulmonary disease (COPD) or heart failure (HF) were found to be significantly different. Our group of patients had markedly higher rates of COPD and HF (46% and 58.7%) than patients described in the literature (9). In WW group most of the patients have had direct hernia (74.6%). The dominant hernia type in WW/ELC and WW/EMC groups were scrotal (47.9%) and indirect (46.2%) hernia. As we have no data about hernia type and treatment approach in previous studies, we have not compared our resuls. But, we have shown a trend to crossover in patients who have had indirect and scrotal hernia. In addition, the female proportion of our population was high (16.2%), but the real difference was in the distribution pattern (9). 12 of 25 women were in the WW/EMC group, and 11 of 25 were in the WW group. Although the number of woman in this study is too small to offer conclusions, as we have no data about the crossover status of women, we may speculate that older women are more likely to hesitate from the surgery than men, and more women experience hernia accidents. When we classified ASA scores into two groups, low and high (I-II, III-IV), we found that the WW and WW/EMC groups had an increased pro-

portion of high ASA scores: 88.9% and 88.5%, respectively. High ASA score patients were prone to observation, also emergent operation and bowel resection were increased in this patients. Our study population had much higher ASA scores than those reported in previous studies (10,11), but ASA score-related bowel resection risk increase was similar, at 9.2 vs 9.3 (12).

At diagnosis, only 17 (11%) of 154 patients chose the operation. This rate is relatively small but there are no data to compare it. Fitzgibbon and O'Dwyer conducted prospective studies, so they randomly chose a sufficient sample size for their operation group to compare data (4,5). Nevertheless, 17% of assigned surgical repair patients did not undergo repair in the Fitzgibbon et al. study. We suggest that the small size of the operation group in our study affected the statistical significance of our results; for accurate conclusions larger study groups are required. On the other hand, we have no data about this specific group of patients, so the reported rate may truly reflect the community setting. 74 (54.1%) patients from the entire WW group had crossed over to an operation at 15 months median follow-up time. It is noteworthy that the previously reported crossover rates for a 2 year follow-up were 23% and 26% for heterogeneous age groups in the studies of Fitzgibbon et al. and O'Dwyer et al., respectively. They studied younger and healthier patients, and concluded that with longer follow-up the crossover rate is even higher. Chung et al. reported a 72% crossover rate with a follow-up of 7.5 years for the patients from the O'Dwyer et al. study (7). In first 6 months, emergent crossover rate was higher than elective crossover (61.5% and 43.8% respectively). However, approximately 90% of our elective and emergent crossover patients were operated in the first year of the follow-up period. The limited median follow-up time of the present study makes it difficult to comment about long-term crossover rates, but we agree with O'Dwyer and Chung. Sarosi et al. found that hernia pain with strenuous activity at baseline was the strongest predictor of crossover in a selected proportion of the Fitzgibbons et al. study population. Marital status, low ASA score, chronic constipation and prostatism were also predictors (8). We found a significant relation between low ASA score and elective crossover. Good general health status was a facilitating factor in choosing elective operation, similar to the findings of Fitzgibbons et al. Also, in the WW/ELC group 36 (75%) patients were operated for increased pain, as in a previous report (8). Its noteworthy that, emergency admission before the diagnosis and increased pain in admission were found to corelated with emergency

crossover. Of note; while bowel resection and complication rate were high in emergency crossover group; postoperative contentment were found to be lower. Also, disease-related mortality was found to be corelated with hearth failure. When advising a patient for observation or when a patient or her/his relatives request waiting, we must consider these factor as predictors of crossover, and also remember that an emergent operation for IH increases postoperative mortality up to ten-fold (13).

In the crossover groups, 48 (64.8%) patients were operated electively, and 26 (33.2%) patients were operated in emergency settings. In the WW/EMC group, patients were operated for increased pain (1, 3.8%), incarceration (6, 23.1%), strangulation (15, 57.5%) and ileus (4, 15.4%). Overall incarceration, strangulation and ileus rates for the whole WW group were 4.3%, 10.9% and 2.9%, respectively. The emergent operation rate for the whole WW group was 18.9% in our comorbid and ≥80 year old IH patients during the 15 months median follow-up time. Althought previously reported hernia accident rates were quite low, 1.25% by O'Dwyer et al. and 0.3% by Fitzgibbons et al., we know that hernia accident risk increases over time in elderly patients (14); in fact in 10 years the cumulative irreducibility rate may reach 30% (15). Nevertheless, our high accident rate may be considered patient- and population-related. Elderly patients with poor general health status were more hesitant to have surgery unless an emergent admission was required. Emergent crossover was found to be correlated with bowel resection, complication and postoperative contentment. 14 of 15 cases of strangulation in the WW/EMC group underwent a bowel resection; the 10.2% overall bowel resection rate for the whole WW group was quite different from the reported rate of 5.4% (16). The complication rate was found to be 11.8% (2) in the O group, 12.5% (6) in the WW/ELC group and 50% (13) in the WW/EMC group. These rates are different from a reported rate of 27.9%, but consistent with our discouraging outcomes (4). Four disease-related excitus were seen, one in the WW/ELC group and three in the WW/EMC group. All of these patients had an ASA IV score and several comorbidities. 3 of the 4 underwent bowel resection for acute presentation of strangulation. Overall mortality rate for whole WW group was 2.9%; according to a recent collective review, this rate is consistent with the 4% (0% - 22.2%) reported in the literature (17). We have found heart failure and bowel resection to be predictive factors of disease-related mortality. Emergent operations were increased mortality risk. Although the overall mortality ratio was consistent with the literature, the morbidity rate was quite high. For a preventible condi-

tion, the likelihood of high morbidity and mortality rates should be carefully evaluated, even in older and frail patients.

Our study population was quite different from the general population. The two hospitals in this study were the last stop for extremely comorbid and risky patients. Due to the role of our hospitals, this study group was an interesting one from which to draw conclusions. The gap in the literature about older IH patients' natural course must be filled with prospective randomized clinical studies. However, the results of our retrospective study suggest that a prospective design may be ethically unacceptable because of the higher hernia accident rate and related higher morbidity and mortality than expected. However, we have no data relating hernia accident to hospital admission time because of the study design. Our results may have been affected by late admission. Another concern was the absence of herniorrhaphy under local anaesthesia with day-case surgery in our hospitals' practice. In our regions, the IH operation is still performed under general and spinal anaesthesia. Due to our patients' expectations from surgeons, day-case surgery and operation with local anaesthesia still represent a very small proportion of our practice. The low hospital stay cost in our country is another facilitating factor. On the other hand, local anaesthesia may be the most beneficial approach for the elderly population. Today, the recommended approach to IH repair is day-case surgery with local anaesthesia, which is suggested to be safe and feasible even in elderly and comorbid patients (18–20).

Although recommending watchful waiting to ≥80 year old comorbid. minimally symptomatic, IH patients sounds logical, the natural course of these patients is intruiging. Planned herniorrhaphy under local anaesthesia for extremely old and comorbid patients seems more acceptable today, but we need large, prospective studies to confirm this conclusion.

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