Research Article / Araştırma Makalesi

A Tertiary Hospital Experience in Incarcerated Anterior Abdominal Wall Hernias

İnkarsere Karın Ön Duvarı Fıtıklarında Üçüncü Basamak Hastane Deneyimi

İlhan TAŞ [1], Ebral YİĞİT [1], Abidin TÜZÜN [1]

[1]Gazi Yasargil Training and Research Hospital Department of General Surgery, Diyarbakır, TÜRKİYE

Abstract

Background: This study aims to evaluate the results of incarcerated anterior abdominal wall hernia cases in which we performed emergency surgery in light of the literature.
Materials and Methods: The records of 124 patients who underwent emergency surgery for incarcerated anterior abdominal wall hernia between January 2016 and December 2019 were retrospectively reviewed. The patients' files, computer records, epicrisis reports, surgery reports, and outpatient clinic records were evaluated. Patients; Age, gender, hernia type, location, time of admission, previous hernia surgery history, affected organs, type of anesthesia applied, surgical techniques, resection status, length of hospital stay, morbidity, and mortality rates were recorded.
Results: The mean age of 124 patients was 59.47 ± 17.75 (17-94) years. Of the patients, 64 (51.6%) were female, and 60 (48.4%) were male. The mean hospital stay was 4.12±3.52 (1-19) days. Thirteen (10.5%) patients had additional disease. General anesthesia was applied to 100 (80.6%) patients, and regional anesthesia was applied to 24 (19.4%) patients. 25 patients were operated on with the diagnosis of recurrence and 99 with the diagnosis of a primary hernia. The most frequently compressed organs in the hernia sac were the omentum (64.5%) and small intestine (32.2%). Bowel resection was performed in 16 of the patients. Mesh was applied to 90 patients during the operation. The most common hernia types were inguinal, umbilical, and incisional. 31 (13.7%) complications developed in 17 patients. Sepsis, wound infection, ileus, atelectasis, and respiratory failure were the most common. Mortality was developed in 6 (4.8%) of the patients.
Conclusions: This study showed that additional disease increases morbidity in hernia cases, and intestinal resection due to strangulation increases morbidity and mortality. Therefore, patients presenting with an incarcerated hernia should be operated on as soon as possible before strangulation develops.

Key Words: Incarcerated hernia, Strangulated hernia, Morbidity, Mortality

Öz

Amaç: Bu çalışmada acil cerrahi uyguladığımız inkarsere karın ön duvarı fıtık sonuçlarının literatür ışığında değerlendirilmesi amaçlandı.
Materyal ve Metod: Ocak 2016 ile Aralık 2019 tarihleri arasında inkarsere karın ön duvarı fıtığı nedeniyle acil cerrahi uygulanan 124 hastanın kayıtları geriye dönük olarak incelendi. Hasta dosyaları, bilgisayar kayıtları, epikriz raporları, ameliyat raporları ve poliklinik kayıtları değerlendirildi. Hastaların yaş, cinsiyet, fıtık tipi, yerleşim yeri, başvuru zamanı, geçirilmiş fıtık cerrahisi öyküsü, etkilenen organlar, uygulanan anestezi tipi, cerrahi teknikler, rezeksiyon durumu, hastanede kalış süresi, morbidite ve mortalite oranları kaydedildi.
Bulgular: Hastaların ortalama yaşı 59,47 ± 17,75 (17-94) idi. Hastaların 64'ü (%51,6) kadın, 60'ı (%48,4) erkekti. Ortalama hastanede kalış süresi 4,12±3,52 (1-19) gündü. On üç (%10,5) hastada ek hastalık mevcuttu. 100 (%80,6) hastaya genel anestezi, 24 (%19,4) hastaya rejyonal anestezi uygulandı. 25 hasta nüks, 99 hasta ise primer herni tanısı ile opere edildi. Fıtık kesesi içinde en sık basıya uğrayan organlar omentum (%64,5) ve ince barsak (%32,2) idi. Hastaların 16'sına barsak rezeksiyonu uygulandı. 90 hastaya operasyon sırasında mesh uygulandı. En sık görülen fıtık tipleri inguinal, umbilikal ve insizyonel fıtıklardır. 17 hastada 31 (%13,7) komplikasyon gelişti. Sepsis, yara enfeksiyonu, ileus, atelektazi ve solunum yetmezliği en yaygın komplikasyonlardı. Hastaların 6'sında (%4,8) mortalite gelişti.
Sonuç: Bu çalışmada ek hastalığın fıtık olgularında morbiditeyi, strangülasyona bağlı intestinal rezeksiyonun morbidite ve mortaliteyi artırdığını görülmüştür. Bu nedenle inkarsere fıtık ile başvuran hastalar strangülasyon gelişmeden en kısa zamanda ameliyat edilmelidir.

Anahtar Kelimeler: İnkarsere herni, Srangüle herni, Morbidite, Mortalite

Corresponding Author/Sorumlu Yazar

Dr. İlhan TAŞ
Gazi Yasargil Training and Research Hospital Department of General Surgery, Diyarbakır, TÜRKİYE

E-mail: ilhantas47@gmail.com

Received / Geliş tarihi: 10.07.2023

Accepted / Kabul tarihi: 25.07.2023

DOI: 10.35440/hutfd.1325197

Introduction

A hernia is the protrusion of any organ or tissue from an abnormal space to a place other than where it should be. An incarcerated hernia is an irreductable hernia (1). Patients with incarcerated anterior abdominal wall hernias (IAAH) are frequently encountered in the emergency department. Such patients usually have localized painful swellings in the groin and abdomen (2). The most common organs in incarcerated hernia sac are the omentum, small intestine, and colon (3). About 5-13% of anterior abdominal wall hernias require emergency surgery due to incarceration. Despite advances in antisepsis, antibiotic therapy, anesthesia, and fluid therapy, the morbidity rate of incarcerated hernias after emergency surgery remains high (4,5).

The treatment of IAAH aims to repair the hernia in a way that reduces both the mortality and morbidity rates and the recurrence rate (6,7). For this purpose, the hernia content should be reduced by rapid surgical exploration, and if necessary, resection of the ischemic hernia content should be performed (5).

This study aims to evaluate the results of incarcerated anterior abdominal wall hernia cases in which we underwent emergency surgery in light of the literature.

Materials and Methods

In this study, the records of 124 patients admitted to Hospital X's emergency department between January 2016 and December 2019 with the diagnosis of IAAH . The study was conducted retrospectively, and approval was obtained from Ethics Committee (Decision on 03/09/2021, number 890) before starting the study. Patients' retrospective information, current files, computer records, epicrisis reports, surgery reports, and outpatient clinic records were evaluated. Patients; Age, gender, hernia type, location of the hernia, time of admission, previous hernia surgery history, affected organs, type of anesthesia applied, surgical techniques, resection status, length of hospital stay, morbidity, and mortality rates were recorded. Hernias with incarceration were considered strangulated hernias if there were signs of intraoperative ischemia and necrosis.

The surgical technique used in hernia repair was determined according to the surgeon's preference. After the neck of the hernia sac was released, and the sac was opened, the organ(s) without signs of ischemia were placed in the abdomen. After 10-15 minutes of warm saline application to the ischemic-appearing organ, the organ whose blood flow improved was placed in the abdomen in the same way. Resection was performed in cases with signs of necrosis. General or regional anesthesia was applied to the patients according to the hernia's location and the patient's comorbidity.

This work was approved by the Research Ethics Committee (Gazi Yaşargil Training and Research Hospital Ethics Committee/03.09.2021/E-890). Descriptive statistics for continuous variables, numbers, and percentages were given for categorical variables. The chi-square test was used to determine the relationship between categorical variables. The statistical significance level was accepted as 5%, and SPSS (ver: 13) statistical program was used for all statistical calculations.

Results

The mean age of 124 patients included in the study was 59.47 ± 17.75 (17-94) years. Of the patients, 64 (51.6%) were female, and 60 (48.4%) were male. The mean hospital stay was 4.12 ± 3.52 (1-19) days. Thirteen patients (10.5%) had additional diseases such as Down syndrome, Diabetes mellitus, hypertension, prostate, lung, and heart diseases. General anesthesia was applied to 100 (80.6%) cases, and regional anesthesia was applied to 24 (19.4%) cases. 25 patients were operated on because of recurrent hernia, and 99 were diagnosed with a primary hernia. The most frequently compressed organs in the hernia sac were the omentum (64.5%) and small intestine (32.2%) (Figure 1).

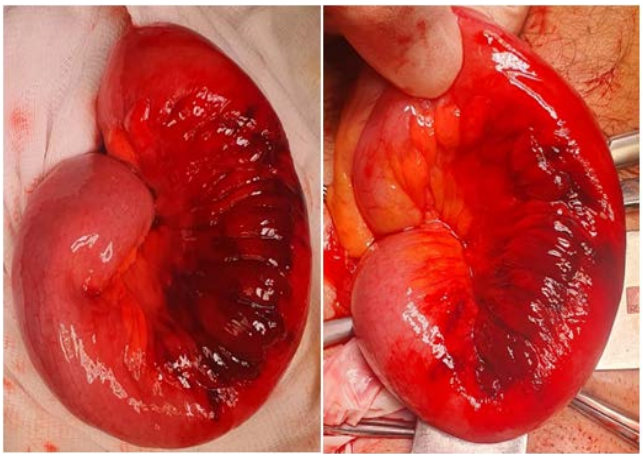

Figure 1. incarcerated small bowel of the sac of incisional hernia

Bowel resection was performed in 16 of the patients. Mesh was applied to 90 patients during the operation—31 (13.7%) complications developed in 17 patients. The most common complications are sepsis, wound infection, ileus, atelectasis, and respiratory failure. The most common systemic complications were from the respiratory system (32.2%). Mortality was observed in 6 (4.8%) of the patients included in the study. The most common hernia types were inguinal hernia 50 (40.3%), umbilical hernia 39 (31.5%), and incisional hernia 22 (17.7%), respectively. The general characteristics of the patients included in the study are summarized in Table 1.

While incisional hernia was more common in women, the inguinal hernia was more common in men and was statistically significant (p:0.04). The distribution of hernias by gender is summarized in Table 2.

Morbidity rates were higher in patients with bowel resection. Morbidity was seen less in patients who underwent mesh replacement. The parameters whose effects on morbidity were investigated in our study are summarized in Table 3.

Mortality rates were higher in patients with additional disease and bowel resection. Mortality was lower in patients who underwent mesh. The parameters whose effects on mortality were investigated in our study are summarized in Table 4.

Table 1. General characteristics of the patients

Age (year) (mean + SD (min-max)	59.47 ± 17.75 (17-94)
Length of stay (day) (mean + SD (min-max)	4.12 ± 3.52 (1-19)
	n (%)
Comorbidity	13 (10.5)
Gender	
Men	60 (48.4)
Women	64 (51.6)
Type of anesthesia	
General	100 (80.6)
Regional	24 (19.4)
Type of hernia	
Primary	99 (79.8)
Recurrent	25 (20.2)
Herniated organ(s)	
Omentum	80 (64.5)
Small intestine	40 (32.2)
Colon	8 (6.5)
Stomach	1 (0.8)
Bowel resection	
Yes	16 (12.9)
No	108 (87.1)
Mesh status	
Yes	90 (72.6)
No	34 (27.4)
Complication(s)	
Sepsis	7 (5.6)
Wound infection	5 (4.0)
Ileus	5 (4.0)
Atelectasis	4 (3.26)
Respiratory failure	4 (3.26)
Pneumonia	1 (0.8)
Pleural effusion	1 (0.8)
ARF*	1 (0.8)
GIS bleeding**	1 (0.8)
AF***	1 (0.8)
Hematoma	1 (0.8)
Total	31 (13.7)
Hernia site	
Epigastric	2 (1.6)
Incisional	22 (17.7)
Femoral	11 (8.9)
Inguinal	50 (40.3)
Umblical	39 (31.5)
Total	124 (100)
Mortality	6 (4.8)

**ARF: Acute renal failure, **GIS: Gastro intestinal system, ***AF: Atrial fibrilation*

Table 2. Hernia distribution by gender

Gender	Epigastric	İncisional	Right Femoral	Right Inguinal	Left Femoral	Left Inguinal	Umblical	Total
Women	1(%1,6)	18(%28.1)	4(%6.3)	7(%10.9)	2(%3.1)	2(%3.1)	30(%46.9)	64(%100)
Men	1(%1,7)	4(%6.7))	3(%5.0)	25(%41.7)	2(%3.3)	16(%26.7)	9(%15.0)	60(%100)
Total	2(%1.6)	22(%17.7)	7(%5.6)	32(%25.8)	4(%3.2)	18(%14.5)	39(%31.5)	124(%100)

Table 3. Comparison of patients with and without morbidity

	Survivors n(%)	Exitus n(%)	p
Comorbidity			**0.006**
No	99 (92.5%)	12(70.6%)	
Yes	8 (7.5%)	5 (29.4%)	
Bowel resection			
No	100 (93.5%)	8 (47.1%)	**0.000**
Yes	7 (6.5%)	9 (52.9%)	
Anestesia type			
General	85 (79.4%)	15 (88.2%)	0.394
Regional	22 (20.6%)	2 (11.8%)	
Hernia site			
Epigastric	2 (1.9%)	0 (0.0%)	
Incisyonal	20 (18.7%)	2 (11.8%)	0.551
Femoral	8 (7.5%)	3 (17.6%)	
Inguinal	42 (39.3%)	8 (47.1%)	
Umblical	35 (32.7%)	4 (23.5%)	
Mesh status			
No	19 (29.7%)	15 (25.0%)	0.559
Yes	45 (72.3%)	45 (75.0%)	
Gender			
Female	57 (53.3%)	7 (41.2%)	0.354
Male	50 (46.7%)	10 (58.8%)	

Table 4. Comparison of patients with and without mortality

	Survivors n(%)	Exitus n(%)	p
Comorbidity			0.061
No	107 (90.7%)	4 (66.7%)	
Yes	11 (9.3%)	2 (33.3%)	
Bowel resection			
No	100 (93.5%)	8 (47.1%)	**0.000**
Yes	7 (6.5%)	9 (52.9%)	
Anesthesia type			
General	94 (79.7%)	6 (100%)	0.219
Regional	24 (20.3%)	0 (0.0%)	
Hernia site			
Epigastric	2 (1.7%)	0 (0.0%)	
Incisyonal	21 (17.8%)	1 (16.7%)	0.936
Femoral	11 (9.3%)	0 (0.0%)	
Inguinal	47 (39.8%)	3 (50.0%)	
Umblical	37 (31.4%)	2 (33.3%)	
Mesh status			
No	28 (23.7%)	6 (100.0%)	**0.000**
Yes	90 (76.3%)	0 (0.0%)	
Gender			
Female	62 (52.5%)	2 (33.3%)	0.358
Male	56 (47.5%)	4 (66.7%)	

Discussion

The presence of a hernia is accepted as an indication of an elective repair operation. Incarcerated inguinal hernias are one of the common causes of acute abdominal pain (8). Incarcerated hernias constitute 5.17% of non-traumatic emergency surgical operations. This is followed by appendicitis and perianal abscesses. In emergencies, IAAH -related surgeries have higher morbidity and mortality rates than elective hernia repairs (1).

Incarcerated femoral and umbilical hernias are more common in women, while incarcerated inguinal hernias are more common in men (9). Similarly, in our study, incarcerated umbilical and femoral hernias were more common in women, while inguinal hernias were more common in men, and the results were consistent with the literature. In addition, in our study, Recurrent hernia was more common in women, which was statistically significant (p:0.04).

While mortality rates in IAAH are 1.4-13.4%, morbidity rates have been reported between 19-30%. Mortality and morbidity have been reported to be associated with strangulation and bowel resection (8,10). Erçetin et al. (8) and Eser et al.

(10) reported morbidity rates as 11.4% and 20%, respectively, and mortality rates as 5.06% and 3%, respectively, in their study. In our study, the mortality rate was 4.8%, and the morbidity rate was 13.7%, consistent with the literature. The morbidity rate was higher in strangulation and bowel resection patients, which was statistically significant (p:0.00).

Due to incarceration, 5-35% of abdominal wall hernias require urgent surgical intervention. Intestinal resection is required in 10-15% of strangulated abdominal wall hernias due to necrosis (9).). Intestinal necrosis and intestinal resection were most frequently observed in inguinal hernias (11). Kurt et al. reported that the female gender, being over 65 years of age, and an irreducible femoral hernia increases the risk of bowel resection (12). In our study, intestinal resection was performed in 12.9% of the cases. There was no significant difference between the strangulation and bowel resection rates in both genders (p:0.51), (p:0.89 In our study, the mean age (p:0.00) and length of hospital stay (p:0.00) of the patients who underwent bowel resection were significantly higher.

Incarcerated inguinal and femoral hernias are more common on the right side. Strangulated hernias are more common in femoral and inguinal hernias (9). However, our study observed strangulation most frequently in inguinal, incisional, and umbilical hernias. In addition, strangulated inguinal hernias were more common on the right in our study.

In many patients, elective hernia operations can be performed under regional and local anesthesia. Emergency incarcerated inguinal hernia repairs carry a higher risk of morbidity and mortality, especially in elderly patients with cardiovascular and pulmonary co-morbidities (10). It has been reported that operations performed under local anesthesia in these patients lead to fewer complications than operations performed under general anesthesia (10,13). In this study, 24 patients were operated under regional anesthesia and 100 patients under general anesthesia, depending on the patient's comorbid condition and the anesthesiologist's preference. There was no statistically significant difference between anesthesia type and morbidity (p:0.39). The difference between the type of anesthesia administered between the genders was statistically significant (p:0.00). Regional anesthesia was used more frequently in men.

Advanced age and co-morbidity are effective factors in the development of complications after emergency incarcerated anterior abdominal wall hernia operations. The incidence of co-morbidities increases with age, and accordingly, the physiological reserves of patients are affected (5). Our study observed that co-morbidity significantly affected morbidity in univariate analysis (p=0.00). In the study of Alvarez et al. (3), pulmonary and cardiovascular complications were reported more frequently in the postoperative period due to advanced age. In our study, the most common complications were from the pulmonary system, with a rate of 32.2%. Using an open, tension-free technique with a mash in elective abdominal wall hernias is common practice. It has been reported that the use of mesh is not contraindicated in incarcerated hernias, even in the presence of strangulation, and beneficial results of its use have been reported (10). In our study, hernia repair with mesh was performed in 72.6% of the patients. It was observed that morbidity was high in our patients who underwent resection and anastomosis and did not apply mesh in hernia repair.

Most surgeons fear the well-known complications that may be associated with foreign material implantation in the setting of an incarcerated or suffocated bowel loop. This issue has been explored in only a few articles, and most herniop-lasty procedures either used no synthetic materials or had very few bowel resections in study groups (11). The use of monofilament polypropylene mesh for strangulated inguinal hernia repair is safe, and the risk of the local infectious complications is low(14). In our study, we performed Lichtenstein Surgery for strangulated hernia repair using a monofilament polypropylene mesh instead of a mesh prosthesis in 27.4% of the patients. We do not prefer to use mesh in our patients who have undergone bowel resection. We believe this is due to resection and comorbidity, not the use of mesh.

Our study has limitations, such as being a retrospective study based on records, operations performed by different surgeons, and considering only a small number of cases.

Conclusion

This study showed that additional disease increases morbidity in hernia cases, and intestinal resection due to strangulation increases morbidity and mortality. Therefore, patients presenting with an incarcerated hernia should be operated on as soon as possible before strangulation develops. Again, we believe all patients admitted to the hospital due to anterior abdominal wall hernia or diagnosed with anterior abdominal wall hernia for any reason should have a hernia repaired as soon as possible under elective conditions.

Ethical Approval: *The study was conducted retrospectively, and approval was obtained from Ethics Committee (Decision on 03/09/2021, number 890) before starting the study.*

Author Contributions:
Concept: İ.T., E.Y., A.T.
Literature Review: İ.T., E.Y.
Design : İ.T., E.Y., A.T.
Data acquisition: İ.T., A.T.
Analysis and interpretation: İ.T., A.T.
Writing manuscript: İ.T., E.Y., A.T.
Critical revision of manuscript: İ.T., E.Y., A.T.

Conflict of Interest: *The authors have no conflicts of interest to declare.*

Financial Disclosure: *Authors declared no financial support.*

References

1. Deveney KE. Hernias and other lesions of the abdominal wall. In: Doherty GM, ed. Current Diagnosis and Treatment: Surgery. New York, N. Y. : McGraw Hill, 2010:724–736.
2. Nieuwenhuizen J, van Ramshorst GH, ten Brinke JG, T de Wit

T, van der Harst E, Hop WCJ et al. The use of mesh in acute hernia: frequency and outcome in 99 cases. Hernia. 2011;15(3):297-300.
3. Alvarez JA, Baldonedo RF, Bear IG, Solís JA, Alvarez P, Jorge JI. Incarcerated groin hernias in adults: presentation and outcome. Hernia. 2004 May;8(2):121-126.
4. Kulah B, Kulacoglu IH, Oruc MT, Duzgun AP, Moran M, Ozmen MM et al. Presentation and outcome of incarcerated external hernias in adults. Am J Surg. 2001 Feb;181(2):101-104.
5. Derici H, Unalp HR, Bozdag AD, Nazli O, Tansug T, Kamer E. Factors affecting morbidity and mortality in incarcerated abdominal wall hernias. Hernia. 2007 Aug;11(4):341-346.
6. Dodds C, Kumar ChM, Servin F. Anaesthesia for the Elderly Patient. 2007 Oxford: Oxford University Press; 55.
7. Peled E, Keren Y, Halachmi S, Soudry M, Zinman C, Kats Y et al. Patients aged 80 and older undergoing orthopedic or urologic surgery: a prospective study focusing on perioperative morbidity and mortality. Gerontology. 2009;55(5):517-522.
8. Erçetin C, Dural AC, Kırnap M, Sayit NF, Tezcaner T. Dağınık kırsal yerleşim bölgesinde boğulmuş fıtık ve geç başvuru sonuçları. Genel Tıp Dergisi 2012; 22(3): 83-86.
9. Ilhan E, Ustuner MA, Senlikci A, Dadali E, Gokcelli U, Simsek H et al (2015). Factors Affecting Morbidity and Mortality in Patients with Incarcerated Abdominal Wall Hernias. Konuralp Tıp Dergisi 2015; 7(2): 108-112.
10. Ezer A, Calışkan K, Colakoğlu T, Parlakgümüş A, Belli S, Tarım A. İntestinal inkarserasyon için acil karın duvarı fıtık onarımı yapılan erişkinlerde morbiditeyi etkileyen faktörler [Factors affecting morbidity in urgent repair of abdominal wall hernia with intestinal incarceration in adults]. Ulus Travma Acil Cerrahi Derg. 2011 Jul;17(4):344-348.
11. 11.Atila, Koray, et al. "Prosthetic repair of acutely incarcerated groin hernias: a prospective clinical observational cohort study." Langenbeck's Archives of Surgery 395 (2010): 563-568.
12. Kurt N, Oncel M, Ozkan Z, Bingul S. Risk and outcome of bowel resection in patients with incarcerated groin hernias: retrospective study. World J Surg. 2003 Jun;27(6):741-743.
13. Ozkan E, Yıldız MK, Cakır T, Dulundu E, Eriş C, Fersahoğlu MM et al. Incarcerated abdominal wall hernia surgery: relationship between risk factors and morbidity and mortality rates (a single center emergency surgery experience). Ulus Travma Acil Cerrahi Derg. 2012 Sep;18(5):389-396.
14. Wysocki, Andrzej, et al. "Is the Lichtenstein operation of strangulated groin hernia a safe procedure?." World journal of surgery 30 (2006): 2065-2070.