PREDIKTORI INKARCERACIJE KILE I POSTOPERATIVNOG RECIDIVA KILE: ANALIZA DEMOGRAFSKIH, KLINIČKIH I HIRURŠKIH FAKTORA KOJI UTIČU NA ISHODE LEČENJA

ORIGINALNI RAD

ORIGINAL ARTICLE

PREDICTORS OF HERNIA INCARCERATION AND POSTOPERATIVE RECURRENCE: ANALYSIS OF DEMOGRAPHIC, CLINICAL, AND SURGICAL FACTORS INFLUENCING TREATMENT OUTCOMES

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SAŽETAK

Uvod/Cilj: Hernije trbušnog zida predstavljaju čestu patologiju u opštoj hirurgiji, sa značajnim rizikom od inkarceracije, recidiva i produžene hospitalizacije. Cilj studije bio je da se analiziraju klinički i operativni faktori povezani sa inkarceracijom, recidivom i dužinom bolničkog lečenja kod operisanih pacijenata.

Materijal i metode: Retrospektivna studija obuhvatila je 230 pacijenata operisanih zbog hernije u Hirurškoj klinici KBC Kosovska Mitrovica. Analizirani su demografski podaci, prisustvo komorbiditeta, tip hernije, inkarceracija, operativna tehnika, vrsta anestezije, recidiv i trajanje hospitalizacije.

Rezultati: Prosečna starost ispitanika iznosila je 58,85±14,77 godina, a muškarci su činili 85,7% uzorka. Najčešća je bila preponska hernija (85,7%), dok je Lichtenstein tehnika primenjena kod 83,9% pacijenata. Recidiv je registrovan kod 4,8%, a inkarceracija kod 16,1% bolesnika. Recidiv nije bio značajno povezan sa polom ($p = 0,164$), vrstom hernije ($p = 0,175$), niti komorbiditetima ($p = 0,110$). Inkarceracija je bila značajno češća kod žena (39,4% *vs.* 12,2%; $p < 0,001$), kao i kod pacijenata operisanih u opštoj endotrahealnoj anesteziji (25,4%; $p = 0,001$). Hospitalizacija je bila duža kod pacijenata sa inkarceracijom (8,22 *vs.* 6,86 dana; $p = 0,017$). Multivarijabilna analiza pokazala je da su starost ($OR = 1,035$; $p = 0,047$) i komorbiditeti ($OR = 3,073$; $p = 0,029$) nezavisni prediktori inkarceracije, dok je lokalna anestezija imala protektivni efekat ($OR = 0,315$; $p = 0,038$).

Zaključak: Recidiv kile pokazuje multifaktorsku prirodu bez jasnih nezavisnih prediktora. Inkarceracija je značajno povezana sa starijim godinama, komorbiditetima i tipom kile i dovodi do produžene hospitalizacije. Ovi nalazi odražavaju ishode primećene u hirurškoj bolnici koja radi u zdravstvenom okruženju sa ograničenim resursima.

Ključne reči: kila, inkarceracija, recidiv, hospitalizacija

ABSTRACT

Introduction/Objective: Hernias of the abdominal wall represent a frequent pathology in general surgery, with a significant risk of recurrence, incarceration, and prolonged hospitalization. The aim of the study was to analyze clinical and operative factors associated with incarceration, recurrence and length of hospital treatment in operated patients.

Materials and methods: A retrospective study included 230 patients operated on for hernia at the Surgical Clinic of CHC Kosovska Mitrovica. Demographic data, presence of comorbidities, type of hernia, incarceration, operative technique, type of anesthesia, recurrence and duration of hospitalization were analyzed.

Results: The average age of the respondents was 58.85±14.77 years, and men made up 85.7% of the sample. The most common was groin hernia (85.7%), while the Lichtenstein technique was used in 83.9% of patients. Recurrence was registered in 4.8% and incarceration in 16.1% of patients. Recurrence was not significantly related to gender ($p = 0.164$), type of hernia ($p = 0.175$), or comorbidities ($p = 0.110$). Incarceration was significantly more common in women (39.4% vs. 12.2%; $p < 0.001$), as well as in patients operated on under general endotracheal anesthesia (25.4%; $p = 0.001$). Hospitalization was longer in patients with incarceration (8.22 vs. 6.86 days; $p = 0.017$). Multivariable analysis showed that age ($OR = 1.035$; $p = 0.047$) and comorbidities ($OR = 3.073$; $p = 0.029$) were independent predictors of incarceration, while local anesthesia had a protective effect ($OR = 0.315$; $p = 0.038$).

Conclusion: Hernia recurrence demonstrates a multifactorial nature with no clear independent predictors. Incarceration is significantly associated with older age, comorbidities, and hernia type and results in prolonged hospitalization. These findings reflect outcomes observed in a surgical hospital operating in a resource-limited healthcare setting.

Keywords: hernia, incarceration, relapse, hospitalization

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UVOD

Ingvinalne kile predstavljaju najčešći tip preponskih kila, manifestujući se kao ispupčenje u preponskoj regiji i potencijalno izazivajući bol, nelagodnost ili opstrukciju creva [1]. Operacija kile i dalje predstavlja jednu od najčešće izvođenih hirurških procedura širom sveta, iako pojedini aspekti zbrinjavanja kila i dalje zahtevaju dodatna istraživanja [2]. Preponske kile obuhvataju ingvinalne i femoralne kile, pri čemu femoralne kile čine približno 4% svih preponskih kila i češće se javljaju kod žena [1]. Femoralne kile su ređe od ingvinalnih kila, ali zbog urgentnosti operativnih zahvata i česte potrebe za resekcijom creva zauzimaju značajno mesto u hirurškoj praksi [3]. Ove kile se uglavnom javljaju kod starijih pacijentkinja [4].

Tokom godina razvijene su brojne hirurške tehnike za operativno zbrinjavanje ingvinalnih kila, sa različitim dugoročnim ishodima. Na osnovu aktuelnih dokaza, međunarodne smernice preporučuju otvorenu reparaciju uz primenu mrežice prema Lichtenstein tehnici i laparo-endoskopske pristupe (TAPP i TEP) kao preferirane opcije lečenja za većinu odraslih pacijenata sa ingvinalnom kilom. Shodno tome, ove tehnike postale su najšire primenjivane metode u savremenoj hirurgiji kila [5–7]. Operativno zbrinjavanje umbilikalnih i epigastričnih kila često se izvodi hirurškim putem, pri čemu izbor metode zavisi od veličine hernijalne kese i fascijalnog defekta [8].

Primena tehnike sa ugradnjom mrežice široko je prihvaćena kao efikasan način lečenja ventralnih i incizionih kila. Operativno zbrinjavanje ventralnih i incizionih kila predstavlja čest hirurški zahvat, sa značajnom učestalošću postoperativnih komplikacija i reintervencija [9]. Sintetička mrežica je široko prihvaćena u hirurgiji ventralnih kila, iako nije jasno da li pruža iste koristi kod pacijenata sa visokim rizikom ili u slučajevima sa kontaminacijom [10].

Poslednjih godina laparoskopski i robotski pristupi zauzimaju sve značajnije mesto u hirurgiji kila. Ipak, njihova primena i dalje zavisi od dostupnih lokalnih zdravstvenih resursa, infrastrukture i prakse zdravstvene ustanove. Budući da minimalno invazivna reparacija kila tokom perioda istraživanja nije bila rutinski dostupna u našoj ustanovi, svi pacijenti uključeni u ovu studiju podvrgnuti su otvorenoj reparaciji kile. Shodno tome, prikazani rezultati odražavaju ishode povezane sa otvorenim hirurškim lečenjem kila trbušnog zida.

Cilj ove studije bio je da se sprovede sveobuhvatna analiza kliničkih, demografskih i operativnih faktora kod pacijenata operisanih zbog kile, sa posebnim fokusom na identifikovanje prediktora postoperativnih ishoda, prvenstveno inkarceracije i recidiva. Istraživanje je takođe imalo za cilj da proceni uticaj tipa kile, ko-

INTRODUCTION

Inguinal hernias are the most common type of groin hernia, presenting as a protrusion in the groin region and potentially causing pain, discomfort, or intestinal obstruction [1]. Hernia repair remains one of the most frequently performed surgical procedures worldwide, although several aspects of hernia management continue to require further investigation [2]. Groin hernias include both inguinal and femoral hernias, with femoral hernias accounting for approximately 4% of all groin hernias and occurring more frequently in women [1]. Femoral hernias are less common than inguinal hernias, but due to the urgency of the procedures and frequent bowel resections, they occupy an important place in surgical practice [3]. These hernias mainly occur in elderly female patients [4].

Over the years, numerous surgical techniques have been developed for inguinal hernia repair, with varying long-term outcomes. Based on current evidence, international guidelines recommend mesh-based open repair using the Lichtenstein technique and laparo-endoscopic approaches (TAPP and TEP) as the preferred treatment options for most adult patients with inguinal hernia. Consequently, these techniques have become the most widely adopted methods in contemporary hernia surgery [5–7]. The procedure for umbilical and epigastric hernia repair is often performed surgically, with the choice of method being determined by the size of the hernial sac and fascial defect [8].

The application of the mesh technique is widely accepted as an effective treatment for ventral and incisional hernias. Ventral and incisional hernia repair is a frequent surgical procedure with a significant incidence of postoperative complications and reinterventions [9]. Synthetic mesh is widely accepted for ventral hernia surgery, although it is unclear whether it provides the same benefits in high-risk patients or in contaminated cases [10].

In recent years, laparoscopic and robotic approaches have gained an increasingly important role in hernia surgery. Nevertheless, their implementation remains dependent on local healthcare resources, infrastructure, and institutional practice. As minimally invasive hernia repair was not routinely available in our institution during the study period, all patients included in this study underwent open hernia repair. Consequently, the presented results reflect outcomes associated with open surgical management of abdominal wall hernias.

The aim of this study was to perform a comprehensive analysis of clinical, demographic, and operative factors in patients operated on for hernia, with a particular focus on identifying predictors of postoperative outcomes, primarily incarceration and recurrence. Also, the aim of the research was to evaluate the influence of type of hernia, the presence of comorbidities, different

morbiditeta, operativnih tehnika i anestezije na dužinu hospitalizacije i stopu komplikacija, kao i da utvrdi koji od navedenih faktora predstavljaju nezavisne prediktore nepovoljnih ishoda.

MATERIJAL I METODE

Ova retrospektivna studija ispitivala je različite aspekte operacija kila analizom podataka prikupljenih iz medicinske dokumentacije i arhive Hirurške klinike KBC Kosovska Mitrovica. Uzorak je obuhvatio 230 pacijenata koji su podvrgnuti operaciji kile tokom jednogodišnjeg perioda. Istraživanje je sprovedeno uz odobrenje Etičkog odbora ustanove u kojoj je istraživanje realizovano, u skladu sa relevantnim etičkim smernicama i standardima. Sve procedure prikupljanja i analize podataka sprovedene su u skladu sa odobrenim protokolom istraživanja, uz poštovanje prava i dobrobiti svih učesnika. U svakom koraku istraživanja obezbeđena je zaštita privatnosti i poverljivosti podataka o pacijentima.

Demografske karakteristike pacijenata detaljno su analizirane. Podaci o starosti i polu pacijenata prikupljeni su i analizirani odvojeno za muškarce i žene. Izračunate su srednja vrednost starosti i standardna devijacija kako bi se dobio detaljan prikaz starosne strukture pacijenata podvrgnutih operaciji kile. Identifikovan je i analiziran tip kile. Izračunat je procenat za svaki tip kile kako bi se utvrdila učestalost i distribucija različitih tipova kila u uzorku.

Identifikovane su i analizirane operativne tehnike korišćene u operacijama kila. Takođe su analizirane učestalost i distribucija svake tehnike u uzorku. Izračunat je i prosečan broj primenjenih operativnih tehnika kako bi se procenila varijabilnost u njihovoj primeni. Pažljivo su praćeni ishodi hirurškog lečenja, uključujući recidiv kile i dužinu hospitalizacije. Pacijenti su grupisani prema prisustvu ili odsustvu inkarceracije i recidiva kile.

U istraživanju je primenjena deskriptivna statistika za analizu osnovnih karakteristika uzorka, uključujući srednje vrednosti, standardne devijacije i procentualne distribucije. Hi-kvadrat test korišćen je za analizu razlika u učestalosti recidiva kile prema polu, komorbiditetima i tipu kile, čime je omogućena procena statističke značajnosti razlika između kategorijalnih varijabli, kao i F-test. Takođe je primenjen Mann-Whitney U test, kao i multivarijabilna analiza. Varijable su uključene u multivarijabilnu logističku regresionu analizu na osnovu kliničke relevantnosti i rezultata univarijantne analize, a ne isključivo na osnovu statističke značajnosti. Starost, pol, komorbiditeti, vrsta anestezije i dužina hospitalizacije uključeni su kao potencijalne konfundirajuće varijable, jer mogu odražavati razlike u kliničkoj prezentaciji, perioperativnom zbrinjavanju i težini bolesti kod pacijenata sa kilom.

operative techniques, and anesthesia s on the duration of hospitalization and the occurrence of complications, as well as to determine which of these factors are independent predictors of an unfavorable outcome.

MATERIALS AND METHODS

A retrospective study investigated various aspects of hernia operations through the analysis of data collected from medical records and archives of the Surgical Clinic of CHC Kosovska Mitrovica. The sample included 230 patients who underwent hernia surgery over a period of one year. This research was conducted with the approval of the Ethics Committee of the institution where the research was conducted in accordance with relevant ethical guidelines and standards. All data collection and analysis procedures were conducted in accordance with the approved research protocol, respecting the rights and well-being of all participants. Each step of the research is conducted in a manner that ensures the protection of privacy and confidentiality of patient data.

The demographic characteristics of the patients were analyzed in detail. Data on patient age and gender were collected and analyzed separately for men and women. The mean age and standard deviation were calculated to obtain a detailed picture of the age structure of patients undergoing hernia surgery. The type of hernia was identified and analyzed. The percentage of each hernia type was calculated to determine the prevalence and distribution of different hernia types in the sample.

Operative techniques used in hernia operations were identified and analyzed. The frequency of application of each technique was analyzed as well as their distribution in the sample. The average number of operative techniques that were applied was also calculated in order to assess the variability in the application of different techniques. Outcomes of surgery, including hernia recurrence and length of hospitalization, were followed in detail. Patients were grouped according to the presence or absence of hernia incarceration and hernia recurrence.

The research used descriptive statistics to analyze the basic characteristics of the sample, including average values, standard deviations, and percentage distributions. The chi-square test was used to analyze the differences in the frequency of hernia recurrence according to gender, comorbidities, and type of hernia, which enabled the assessment of the statistical significance of the differences between categorical variables as well as the F-test. The Mann-Whitney U test was also applied, as well as multivariable analysis. Variables were included in the multivariable logistic regression analysis based on their clinical relevance and the results of the univariate analysis, rather than solely on statistical significance.

Iako neke varijable, kao što su starost i komorbiditeti, nisu bile statistički značajne u univarijabilnim analizi, uključene su u multivarijabilni model zbog njihove dokazane kliničke značajnosti i potencijalnog uticaja na ishode lečenja. Istovremeno, nisu uključene sve dostupne varijable kako bi se izbeglo preopterećenje modela i povećanje rizika od overfittinga imajući u vidu veličinu uzorka, čime su očuvane stabilnost i interpretabilnost regresionog modela [11,12]. Ova kombinacija statističkih testova omogućila je sveobuhvatnu analizu uticaja različitih faktora na ishode lečenja kila u ispitivanoj populaciji. Svi statistički testovi interpretirani su uz nivo značajnosti od $p < 0,05$, što predstavlja standardni prag za statističku značajnost. Korišćen je softverski paket SPSS Statistics 20.

REZULTATI

Ova studija analizirala je podatke 230 pacijenata sa dijagnozom kila prednjeg trbušnog zida. Sociodemografski podaci pokazali su da je prosečna starost ispitanika iznosila 58,85 ± 14,77 godina, pri čemu su muškarci činili 85,7%, a žene 14,3% ispitanika; preostale varijable prikazane su u Tabeli 1.

U analizi dužine hospitalizacije i starosti u odnosu na recidiv, nije utvrđena statistički značajna razlika ($p = 0,757$; $p = 0,418$), što ukazuje na to da ovi faktori nisu povezani sa recidivom u ovoj studiji. Nije utvrđena statistički značajna povezanost između demografskih i kliničkih karakteristika i recidiva. Pol ($p = 0,164$), tip kile, operativna tehnika, vrsta anestezije, inkarceracija

Age, sex, comorbidities, type of anesthesia, and length of hospitalization were included as potential confounding variables because they may reflect differences in clinical presentation, perioperative management, and disease severity among patients with hernia.

Although some variables, such as age and comorbidity, did not show statistical significance in the univariable analysis, their inclusion in the multivariable model was considered justified due to their proven clinical significance and potential impact on the treatment results, while at the same time uncritical inclusion of all available variables was not carried out in order to avoid overloading the model and the risk of overfitting in relation to the sample size, thus preserving the stability and interpretability of the regression model [11,12]. This combination of statistical tests enabled a comprehensive analysis of the influence of various factors on hernia outcomes in the study population. All statistical tests were interpreted with the significance level set at $p < 0.05$, which is the standard threshold for statistical significance. The SPSS Statistics 20 software package was used.

RESULTS

In this study, data collected from 230 patients diagnosed with anterior abdominal wall hernias were analyzed. Socio-demographic data showed that the average age of the subjects was 58.85 ± 14.77 years, with a male and female percentage of 85.7% and 14.3%, respectively, while the remaining variables examined are shown in Table 1.

Tabela 1. Ispitivane varijable

Table 1. Tested variables

Varijable / *Variables*, medijana (opseg) / *median (range)*	***n* = 230**
Starost, medijana (opseg) / *Years of life, median (range)*	61 (18–88)
Dužina hospitalizacije, med. (min-max) / *Duration of hospitalization, med. (min-max*	6 (0–20)
Pol, n (%) / *Sex, n (%)*	
Muški / *Male*	197 (85.7)
Ženski / *Female*	33 (14.3)
Tip kile, n (%) / *Type of hernia, n (%)*	
Preponska / *Groin*	197 (85.7%)
Ventralna / *Ventral*	33 (14.3%)
Operativna tehnika, n (%) / *Operative technique, n (%)*	
Lichtenstein/Bassini / *Lichtenstein/Bassini*	193 (83.9%)
Lotheissen / *Lotheissen*	4 (1.7%)
Rives sublay/Mesh / *Rives sublay/Mesh*	33 (14.3%)
Recidiv kile, n (%) / *Hernia recurrence, n (%)*	
Da / *Yes*	11 (4.8)
Ne / *No*	219 (95.2)
Inkarceracija kile, n (%) / *Incarceration of hernia, n (%)*	
Da / *Yes*	37 (16.1)
Ne / *No*	193 (83.9)
Komorbiditeti, n (%) / *Comorbidites, n (%)*	
Da / *Yes*	95 (41.3)
Ne / *No*	135 (58.7)

Tabela 2. Korelacija kliničkih karakteristika sa recidivom

Table 2. Correlation of clinical characteristics with recurrence

Varijable / *Variables*	Bez recidiva / *Without recurrence* n (%)	Sa recidivom / *With recurrence* n (%)	p
Pol / *Sex*			
Muški / *Male*	186 (94.4%)	11 (5.6%)	0.164
Ženski / *Female*	33 (100%)	0 (0%)	
Tip kile / *Type of hernia*			
Preponska / *Groin*	186 (94.4%)	11 (5.6%)	0.175
Ventralna / *Ventral*	33 (100%)	0 (0%)	
Operativna tehnika / *Operative technique*			
Lichtenstein / *Bassini*	182 (94.3%)	11 (5.7%)	
Lotheissen / *Lotheissen*	4 (100%)	0 (0%)	
Rives sublay / *Mesh*	33 (100%)	0 (0%)	
Inkarceracija kile / *Incarceration of hernia*			
Ne / *No*	182 (94.3%)	11 (5.7%)	0.137
Da / *Yes*	37 (100%)	0 (0%)	
Anestezija / *Anesthesia*			
Lokalna / *Local*	121 (96.0%)	5 (4.0%)	0.548
Spinalna / *Spinal*	32 (97.0%)	1 (3.0%)	
GETA / *GETA*	66 (93.0%)	5 (7.0%)	
Komorbiditeti / *Comorbidites*			
Ne / *No*	126 (93.3%)	9 (6.7%)	0.110
Da / *Yes*	93 (97.9%)	2 (2.1%)	

GETA (opšta endotrahealna anestezija)

GETA (general endotracheal anesthesia)

(p = 0,137) i komorbiditeti nisu predstavljali značajne prediktore, iako su svi slučajevi recidiva zabeleženi kod muškaraca (Tabela 2).

Nije utvrđena statistički značajna razlika u starosti između pacijenata sa i bez inkarceracije (p = 0,176), iako je u grupi pacijenata sa inkarceracijom uočena tendencija ka većoj starosti. Nasuprot tome, pacijenti sa inkarceracijom imali su statistički značajno duže trajanje hospitalizacije (p = 0,017) (Tabela 3).

Utvrđena je statistički značajna povezanost između nekoliko kliničkih i operativnih karakteristika i pojave inkarceracije. Veća učestalost inkarceracije zabeležena je kod žena sa femoralnim kilama, kao i kod pacijenata operisanih primenom određenih operativnih tehnika i u opštoj endotrahealnoj anesteziji. Nasuprot tome, komorbiditeti i recidiv nisu bili statistički značajno povezani sa pojavom inkarceracije (Tabela 4).

In the analysis of the duration of hospitalization and age in relation to the presence of recurrence, no statistically significant difference was found (p = 0.757; p = 0.418), which indicates that these factors are not related to the occurrence of recurrence in this study. No statistically significant association was found between demographic and clinical characteristics and recurrence. Gender (p = 0.164), type of hernia, operative technique, type of anesthesia, incarceration (p = 0.137), and comorbidities were not significant predictors, although all recurrences were recorded in men (Table 2).

No statistically significant difference in age was found between patients with and without incarceration (p = 0.176), although a tendency towards older age was noted in the group with incarceration. In contrast, the duration of hospitalization was significantly longer in patients with incarceration (p = 0.017) (Table 3).

Tabela 3. Poređenje starosti i dužine hospitalizacije u odnosu na prisustvo inkarceracije

Table 3. Comparison of age and duration of hospitalization according to the presence of incarceration

Parametar / *Parameter*	Bez inkarceracije / *Without incarceration (n = 193)*	Sa inkarceraciom / *With incarceration (n = 37)*	p
Starost / *Years of life*	60 (18–88)	63 (31–88)	0.176
Dužina hospitalizacije / *Duration of hospitalization*	6 (0–18)	7 (4–20)	0.017

Tabela 4. Kliničke karakteristike povezane sa pojavom inkarceracije

Table 4. Clinical characteristics associated with the occurrence of incarceration

Varijable / *Variables*	Bez recidiva / *Without recurrence* n (%)	Sa recidivom / *With recurrence* n (%)	p
Pol / *Sex*			
Muški / *Male*	173 (87.8%)	24 (12.2%)	< 0.001
Ženski / *Female*	20 (60.6%)	13 (39.4%)	
Tip kile / *Type of hernia*			
Preponska / *Groin*	169 (85.8%)	28 (14.2%)	0.057
Ventralna / *Ventral*	24 (72.7%)	9 (27.3%)	
Operativna tehnika / *Operative technique*			
Lichtenstein/Bassini / *Lichtenstein/Bassini*	169 (87.6%)	24 (12.4%)	
Lotheissen / *Lotheissen*	0 (0%)	4 (100%)	
Rives sublay/Mesh / *Rives sublay / Mesh*	24 (72.7%)	9 (27.3%)	
Anestezija / *Anesthesia*			
Lokalna / *Local*	116 (92.1%)	10 (7.9%)	0.001
Spinalna / *Spinal*	24 (72.7%)	9 (27.3%)	
GETA / *GETA*	53 (74.6%)	18 (25.4%)	
Komorbiditeti / *Comorbidites*			
Ne / *No*	110 (81.5%)	25 (18.5%)	0.232
Da / *Yes*	83 (87.4%)	12 (12.6%)	
Recidiv kile / *Hernia recurrence*			
Ne / *No*	182 (83.1%)	37 (16.9%)	0.137
Da / *Yes*	11 (100%)	0 (0%)	

GETA (opšta endotrahealna anestezija)

GETA (general endotracheal anesthesia)

Izbor operativne tehnike bio je statistički značajno povezan sa dužinom hospitalizacije (p = 0,016). Pacijenti lečeni Rives sublay tehnikom imali su duži boravak u bolnici, dok su pacijenti kod kojih su primenjene manje kompleksne procedure reparacije kile imali kraći boravak. Starost pacijenata nije se statistički značajno razlikovala između grupa prema operativnoj tehnici (p = 0,865), što ukazuje na uporedivu starosnu distribuciju (Tabela 5).

U analizi povezanosti operativne tehnike sa kliničkim ishodima i karakteristikama pacijenata utvrđeno je da operativna tehnika nije bila statistički značajno povezana sa pojavom recidiva (p = 0,657). Nasuprot tome, operativna tehnika bila je statistički značajno povezana sa inkarceracijom (p < 0,001), što ukazuje na različitu distribuciju hirurških procedura u zavisnosti od

A statistically significant association was established between several clinical and operative characteristics and the occurrence of incarceration. A higher frequency was recorded in women with femoral hernias, as well as in patients operated on with certain techniques and under general endotracheal anesthesia. In contrast, comorbidities and recidivism were not significantly associated with incarceration (Table 4).

The choice of operative technique was significantly associated with the duration of hospitalization (p = 0.016). Longer hospital stays were observed in patients treated using the Rives sublay technique, whereas shorter stays were recorded following less extensive hernia repair procedures. Patient age did not differ significantly between operative technique groups (p = 0.865), indicating a comparable age distribution (Table 5).

Tabela 5. Starost i dužina hospitalizacije u odnosu na operativnu tehniku

Table 5. Age and duration of hospitalization according to operative technique

Operativna tehnika / *Operative technique, as±SD/ mean±SD*	n = 230	Starost / *Years of life*	Dužina hospitalizacije / *Duration of hospitalization*
Lichtenstein/Bassini / *Lichtenstein/Bassini*	193	59.03 ± 14.80	6.81 ± 2.78
Lotheissen / *Lotheissen*	4	56.25 ± 14.19	5.00 ± 0.00
Rives sublay/Mesh / *Rives sublay/Mesh*	33	58.12 ± 15.04	8.88 ± 4.57
p*-vrednost / *p-value		0.865	0.016

prisustva inkarceracije. Operativna tehnika je takođe bila statistički značajno povezana sa vrstom anestezije ($p < 0,001$), pri čemu su složenije tehnike češće izvođene u opštoj endotrahealnoj anesteziji. Utvrđena je izuzetno snažna povezanost između operativne tehnike i tipa kile ($p < 0,001$), što ukazuje na to da je izbor operativne tehnike u velikoj meri zavisio od tipa kile. Pored toga, operativna tehnika bila je statistički značajno povezana sa prisustvom komorbiditeta ($p = 0,009$). Ovi nalazi ukazuju na to da operativna tehnika nije nezavisan faktor u analizi ishoda, već da je u velikoj meri određena kliničkim karakteristikama pacijenata i tipom kile.

U analizi starosti pacijenata u odnosu na tip kile nije utvrđena statistički značajna razlika između posmatranih grupa ($p = 0,913$). Srednji rangovi starosti bili su slični među različitim tipovima kila, što ukazuje na to da starost pacijenata nije bila povezana sa tipom kile. Nasuprot tome, u analizi dužine hospitalizacije prema tipu kile utvrđena je statistički značajna razlika između grupa ($p < 0,001$). Ventralne kile (191,04) i ingvinoskrotalne kile (170,62) imale su najviše srednje rangove dužine hospitalizacije, što ukazuje na duži boravak u bolnici kod ovih pacijenata. Femoralne kile imale su najniži srednji rang (85,00), dok su ingvinalne i umbilikalne kile imale međuvrednosti. Ovi rezultati ukazuju na to da tip kile značajno utiče na dužinu hospitalizacije.

Tip kile bio je statistički značajno povezan sa većinom demografskih, kliničkih i operativnih karakteristika. Pol ($p < 0,001$) i operativna tehnika ($p < 0,001$) pokazali su snažnu povezanost, pri čemu su ingvinalne i ingvinoskrotalne kile preovlađivale kod muškaraca, a femoralne i ventralne kile kod žena. Nije utvrđena povezanost sa recidivom ($p = 0,458$), dok je utvrđena statistički značajna povezanost sa inkarceracijom ($p < 0,001$), vrstom anestezije ($p < 0,001$) i komorbiditetima ($p = 0,017$). Ovi rezultati ukazuju na to da je tip kile važan faktor u kliničkom toku bolesti i izboru terapije.

Komorbiditeti su bili statistički značajno povezani sa većom starošću i dužim trajanjem hospitalizacije (Tabela 6).

Prisustvo komorbiditeta nije bilo statistički značajno povezano sa polom ($p = 0,888$), recidivom ($p = 0,110$), inkarceracijom ($p = 0,232$) niti vrstom anestezije ($p = 0,321$). Nasuprot tome, utvrđena je statistički značajna povezanost sa operativnom tehnikom

In the analysis of the association of the operative technique with clinical outcomes and patient characteristics, it was determined that the operative technique was not significantly associated with the occurrence of recurrence ($p = 0.657$). In contrast, a statistically significant association between the operative technique and the occurrence of incarceration was determined ($p < 0.001$), which indicates a different distribution of surgical procedures depending on the presence of incarceration. Also, the operative technique was significantly related to the type of anesthesia ($p < 0.001$), whereby more complex techniques were more often performed under general endotracheal anesthesia. An extremely strong correlation was found between the operative technique and the type of hernia ($p < 0.001$), which indicates that the choice of operative technique largely depended on the type of hernia. In addition, operative technique was significantly associated with the presence of comorbidities ($p = 0.009$). These findings indicate that the operative technique is not an independent factor in the outcome analysis but is strongly determined by the clinical characteristics of the patients and the type of hernia.

In the analysis of the age of the patients in relation to the type of hernia, no statistically significant difference was found between the observed groups ($p = 0.913$). The mean age ranks were similar among the different types of hernias, indicating that the age of the patients was not related to the type of hernia. In contrast, in the analysis of the duration of hospitalization according to the type of hernia, a statistically significant difference between the groups was determined ($p < 0.001$). The highest median ranking of hospitalization duration was recorded for ventral (191.04) and inguinoscrotal hernias (170.62), which indicates a longer hospital stay in these patients. The lowest mean rank was recorded for femoral hernias (85.00), while inguinal and umbilical hernias had medium values. These results indicate that the type of hernia significantly affects the duration of hospitalization.

Hernia type was significantly associated with most demographic, clinical, and operative characteristics. Gender ($p < 0.001$) and operative technique ($p < 0.001$) showed a strong association, with inguinal and inguinoscrotal hernias predominating in men and femoral and ventral hernias in women. No association was found with

Tabela 6. Starost i dužina hospitalizacije u odnosu na prisustvo komorbiditeta

Table 6. Age and duration of hospitalization according to the presence of comorbidities

Parametar / *Parameter* ***medijana (opseg) / median (range)***	**Bez komorbiditeta (n = 135)** ***/ Without comorbidities (n = 135)***	**Sa komorbiditetima (n = 95)** ***/ With comorbidities (n = 95)***	***p***
Starost / *Years of life*	58 (18–78)	67 (29–88)	< 0,001
Dužina hospitalizacije / *Duration of hospitalization*	6 (0–20)	7 (4–20)	0.002

Tabela 7. Multivarijabilna logistička regresija prediktora inkarceracije

Table 7. Multivariable logistic regression for predictors of incarceration

Varijable / *Variables*	*OR*	*95% CI*	*p*
Starija životna dob / *Old age*	1.035	1.000–1.071	0.047
Dužina hospitalizacije / *Duration of hospitalization*	1.090	0.945–1.258	0.235
Pol / *Sex*	0.488	0.122–1.958	0.312
Anestezija (lokalna) / *Anesthesia (local)*	0.315	0.106–0.936	0.038
Komorbiditeti / *Comorbidities*	3.073	1.119–8.440	0.029

(p = 0,006) i tipom kile (p = 0,007), što ukazuje na to da komorbiditeti ne utiču direktno na ishode, već mogu delovati kao konfundirajući faktori u analizi.

Multivarijabilna logistička regresija pokazala je da je model statistički značajan. Starost i prisustvo komorbiditeta identifikovani su kao nezavisni prediktori inkarceracije, pri čemu su komorbiditeti povećavali verovatnoću njenog nastanka približno tri puta. Vrsta anestezije bila je granično statistički značajna (lokalna anestezija kao protektivni faktor), dok dužina hospitalizacije, pol, tip kile i operativna tehnika nisu imali nezavisan uticaj (Tabela 7).

DISKUSIJA

Ova studija usmerena je na ishode hirurškog lečenja kila procenjene tokom jednogodišnjeg perioda praćenja. Analizom jednogodišnjeg perioda, u našoj studiji identifikovani su značajni trendovi i prognostički faktori koji utiču na uspešnost operacija kila. U ovoj diskusiji razmatramo implikacije naših nalaza u kontekstu postojećih istraživanja i njihovu relevantnost za kliničku praksu.

Kriterijumi za uključivanje i isključivanje iz studije imaju ključnu ulogu u definisanju uzorka i obezbeđivanju pouzdanih rezultata. U studiju su uključeni pacijenti stariji od 18 godina koji su podvrgnuti operaciji kile. Pored toga, bilo je neophodno da pacijenti imaju kompletnu medicinsku dokumentaciju dostupnu za analizu. Sa druge strane, iz studije su isključeni pacijenti mlađi od 18 godina, kao i oni koji nisu podvrgnuti operaciji kile u definisanom periodu. Isključeni su i pacijenti sa teškim komorbidnim stanjima koja bi mogla značajno uticati na interpretaciju ishoda hirurškog lečenja. Ovi kriterijumi obezbedili su odgovarajuću reprezentativnost uzorka i validnost rezultata istraživanja.

Prilikom analize recidiva kile kod naših pacijenata, uočili smo da većina njih (95,2%) nakon operacije nije imala recidiv kile, dok je samo mali procenat (4,8%) imao recidiv. Iako recidiv kile i dalje predstavlja važnu postoperativnu komplikaciju, tehnike reparacije uz primenu mrežice značajno su smanjile stope recidiva u poređenju sa tradicionalnim reparacijama tkivom, što

relapse (p = 0.458), while a significant association with incarceration (p < 0.001), type of anesthesia (p < 0.001), and comorbidities (p = 0.017) was found. These results indicate that the type of hernia is an important factor in the clinical course and the choice of therapy.

The presence of comorbidities was significantly associated with older age and longer duration of hospitalization (Table 6).

The presence of comorbidities was not significantly related to gender (p = 0.888), recurrence (p = 0.110), incarceration (p = 0.232), or type of anesthesia (p = 0.321). In contrast, a significant association with operative technique (p = 0.006) and hernia type (p = 0.007) was found, indicating that comorbidities do not directly affect outcomes but may act as confounders in the analysis.

Multivariable logistic regression showed that the model was statistically significant. Age and the presence of comorbidities were identified as independent predictors of incarceration, with comorbidities increasing the probability of its occurrence by about three times. The type of anesthesia was marginally significant (local protective), while the duration of hospitalization, sex, type of hernia, and operative technique had no independent influence (Table 7).

DISCUSSION

The present study focuses on hernia surgery outcomes assessed during a one-year follow-up period. Analyzing a one-year period, our study identified significant trends and prognostic factors affecting the success of hernia operations. Throughout this discussion, we will consider the implications of our findings in the context of existing research, as well as their relevance to clinical practice.

Study inclusion and exclusion criteria play a key role in defining the sample and ensuring reliable results. To enter the study, patients older than 18 years who underwent hernia surgery were included. Also, it was necessary for the medical data of these patients to be complete and available for analysis. On the other hand, patients under the age of 18, those who did not undergo hernia surgery in the specified period, were excluded from the study. Patients with severe comorbid conditions that could significantly affect the inter-

je pokazano u međunarodnim smernicama i velikim kliničkim studijama [7]. U našoj studiji, kao i u istraživanju Rodriguesa i sar. [13], uočavamo da je stopa reoperacija značajno niža od očekivane. Pored toga, tokom perioda istraživanja, recidivne ingvinalne kile činile su 13,5% svih kila [14]. Ova promena u hirurškoj praksi značajno doprinosi smanjenju opterećenja za pacijente, smanjujući potrebu za ponovljenim operacijama i poboljšavajući kvalitet života. Uvođenje mrežice kao standardne metode u hirurgiji ingvinalnih kila predstavlja korak ka uspešnijim i dugotrajnijim rezultatima.

U analizi starosne strukture između muškaraca i žena uočili smo razliku u stepenu varijabilnosti, pri čemu su muškarci pokazali nešto veću varijabilnost u distribuciji starosti u poređenju sa ženama, što je u skladu sa rezultatima istraživanja koja su identifikovala muški pol i starost kao faktore rizika za nastanak ingvinalne kile [5,15,16]. Nadalje, Aydin i sar. navode veću učestalost muškaraca (90,7%) [17]. Ovo naglašava značaj uzimanja u obzir pola i starosne strukture prilikom procene rizika i planiranja lečenja pacijenata sa ingvinalnim kilama. Femoralne kile, koje su retke među kilama, podvrgavaju se različitim dobro ustanovljenim tehnikama i u urgentnim i u elektivnim uslovima [18]. Iako femoralne kile čine samo mali deo slučajeva kila, ingvinalne kile predstavljaju najčešći tip, sa udelom od 76,1% svih slučajeva. Nasuprot tome, prisustvo femoralne kile zabeleženo je u samo 2,2% slučajeva [18]. Važno je napomenuti da se femoralne kile često operišu kao urgentni slučajevi [19]. Ova razlika u učestalosti između ingvinalnih i femoralnih kila može odražavati razlike u etiologiji, kliničkoj prezentaciji i pristupu lečenju.

Operacija umbilikalne kile predstavlja često izvođen hirurški zahvat; međutim, tačna zastupljenost prema polu i starosti ovih operacija na nivou cele zemlje ostaje nepoznata [20]. U studiji Deo i sar., ingvinalna kila bila je najčešći tip (77,25%), dok je umbilikalna kila zauzimala drugo mesto (8,61%), što je u skladu sa našim nalazima [2]. Analiza rezultata pokazuje da nije utvrđena statistički značajna razlika između pacijenata sa i bez recidiva kile prema polu ($p = 0,164$). Zanimljivo je da je stopa recidiva kile u retrospektivnoj studiji umbilikalnih kila iznosila 3%, što je slično studiji ventralnih kila, u kojoj je stopa recidiva iznosila 10% [8,10]. Ovi rezultati naglašavaju značaj kontinuiranog praćenja nakon operacije kile radi pravovremenog otkrivanja postoperativnih komplikacija i recidiva.

Lečenje ventralnih kila nastavlja da se unapređuje kako bi odgovorilo na nove zahteve i tehnološke inovacije u hirurgiji [21]. Ovaj kontinuirani razvoj odražava posvećenost medicinske zajednice unapređenju lečenja ventralnih kila i ishoda kod pacijenata.

Dobijeni rezultati ukazuju na to da starost nije bila

pretation of surgical outcomes were excluded from the analysis. These criteria were set in order to ensure the adequate representativeness of the sample and the validity of the research results.

When analyzing hernia recurrence in our patients, we observed that most of them (95.2%) did not have recurrence of hernia after surgery, while only a small percentage (4.8%) had recurrence. Although hernia recurrence remains an important postoperative complication, the introduction of mesh-based repair techniques has substantially reduced recurrence rates compared with traditional tissue-based repairs, as demonstrated in international guidelines and large clinical studies [7]. In our study, as well as in the research of Rodrigues et al. [13], we note that the percentage of reoperations is significantly lower compared to the expected values. Additionally, during the study period, recurrent inguinal hernias accounted for 13.5% of all hernias [14]. This change in surgical practice brings significant relief to patients, reducing the need for repeat operations and improving their quality of life. The introduction of mesh as a standard procedure in inguinal hernia surgery represents a step forward in achieving more successful and long-lasting results.

In the analysis of the age structure between men and women, we note a difference in the level of variability, whereby men showed a slightly greater variability in age distribution compared to women, which is in accordance with the results of research that identified male gender and age as risk factors for the occurrence of inguinal hernia [5,15,16]. Furthermore, in the study by Aydin et al., a higher frequency of men (90.7%) was observed [17]. This highlights the importance of considering gender and age structure when assessing risk and planning treatment in patients with inguinal hernias. Femoral hernias, which are rare among hernias, undergo a variety of well-established techniques in both emergency and elective settings [18]. Although femoral hernias make up only a small part of hernial cases, inguinal hernias are the most common type, accounting for 76.1% of all cases, while the presence of femoral hernia was noted in only 2.2% of cases [18]. It is notable that femoral hernias are often operated on as an emergency [19]. This difference in frequency between inguinal and femoral hernias may indicate differences in the etiology, clinical presentation, and treatment approach of these conditions.

Umbilical hernia repair is a frequently performed surgical procedure; however, the exact gender and age prevalence of these surgeries across the country remains unknown [20]. In the study by Deo et al., inguinal hernia was identified as the most common type (77.25%), while umbilical hernia took the second place in terms of prevalence (8.61%), which coincides with

statistički značajno povezana sa pojavom inkarceracije, iako je kod ovih pacijenata uočena tendencija ka većoj starosti. Slični nalazi opisani su u novijim studijama, u kojima starost nije uvek identifikovana kao nezavisan faktor rizika za inkarceraciju, već pre kao indirektan pokazatelj opšteg zdravstvenog stanja i prisustva drugih faktora rizika [22]. Nasuprot tome, ova studija je pokazala statistički značajno duže trajanje hospitalizacije kod pacijenata sa inkarceracijom, što je u skladu sa prethodnim istraživanjima koja pokazuju da inkarcerirane kile imaju teži klinički tok, češće zahtevaju urgentne intervencije i povezane su sa većom učestalošću postoperativnih komplikacija, što produžava boravak u bolnici [23]. Statistički značajna povezanost ženskog pola i femoralnih kila sa inkarceracijom u ovoj analizi takođe je potvrđena u literaturi. Studije pokazuju da su ženski pol i femoralni tip kile nezavisni faktori rizika za inkarceraciju, verovatno zbog anatomskih specifičnosti i kasnijeg ispoljavanja simptoma [22].

Kada je reč o recidivu, rezultati nisu pokazali značajnu povezanost sa ispitivanim faktorima, što je u skladu sa istraživanjima koja naglašavaju multifaktorijalnu prirodu recidiva. Faktori kao što su starost, BMI, infekcija rane i širina defekta češće se izdvajaju kao značajni, dok pojedinačne kliničke varijable često nemaju nezavisan uticaj [24]. Nadalje, statistički značajna povezanost između operativne tehnike i dužine hospitalizacije, kao i drugih kliničkih karakteristika, u ovoj studiji podržava stav da hirurška metoda nije nezavisan faktor, već da je određena tipom kile i stanjem pacijenta. Takođe je uočena statistički značajna povezanost između operativne tehnike i vrste anestezije. Složenije procedure češće su izvođene u opštoj endotrahealnoj anesteziji, što je očekivano imajući u vidu duže trajanje operacije, veću hiruršku složenost i potrebu za optimalnim intraoperativnim uslovima. Nasuprot tome, manje zahtevne procedure češće su izvođene u lokalnoj anesteziji, što odražava savremene trendove u hirurgiji kila i individualizovani perioperativni pristup. Velike prospektivne studije ukazuju na to da faktori kao što su veličina defekta i tip kile značajno utiču na klinički tok i izbor terapije [25]. Konačno, identifikovanje starosti i komorbiditeta kao nezavisnih prediktora inkarceracije u multivarijabilnoj analizi u skladu je sa savremenim shvatanjem da sistemski faktori povezani sa pacijentom (opšte stanje, hronične bolesti) imaju značajnu ulogu u progresiji bolesti, čak i kada pojedinačne kliničke varijable nisu značajne u univarijantnim analizama [22].

Ovo istraživanje ima nekoliko prednosti, ali i određena ograničenja koja zahtevaju pažljivo razmatranje. Među prednostima istraživanja ističe se longitudinalni pristup, koji je omogućio praćenje ishoda operacija kila. Ova analiza pruža dublje razumevanje trendova

the findings of our study [2]. Analysis of the results indicates that there is no statistically significant difference between the groups of patients with and without hernia recurrence when it comes to gender ($p = 0.164$). It is interesting that the rate of hernia recurrence in a retrospective study of umbilical hernias was 3%, which is similar to the finding in a study of ventral hernias where the rate was 10% [8,10]. These results highlight the importance of continuous follow-up after hernia surgery in order to detect postoperative complications and recurrences in a timely manner.

Ventral hernia treatment is constantly being improved to meet new demands and technological innovations in surgery [21]. This continued development reflects the commitment of the medical community to improve the treatment of ventral hernias and provide better patient outcomes.

The obtained results indicate that age was not statistically significantly associated with the occurrence of incarceration, although a tendency towards older age was observed in these patients. Similar findings have been described in recent studies, where age is not always identified as an independent risk factor for incarceration, but rather as an indirect indicator of general health status and the presence of other risk factors [22]. In contrast, this study found a significantly longer duration of hospitalization in patients with incarceration, which is consistent with previous research showing that incarcerated hernias have a more severe clinical course, require emergency interventions more often, and are associated with greater postoperative complications, which prolongs hospital stay [23]. The significant association between female gender and femoral hernias with incarceration in this analysis was also confirmed in the literature. Studies show that female gender and femoral type of hernia are independent risk factors for incarceration, probably due to anatomical specificities and later onset of symptoms [22].

Regarding relapse, the results did not show a significant association with the examined factors, which is in line with research that emphasizes the multifactorial nature of relapse. Factors such as age, BMI, wound infection, and defect width are more often singled out as significant, while individual clinical variables by themselves often have no independent influence [24]. Furthermore, the significant association of the operative technique with the duration of hospitalization and other clinical characteristics in this study confirms the view that the choice of surgical method is not an independent factor but is determined by the type of hernia and the condition of the patient. A significant association was also observed between the operative technique and the type of anesthesia. More complex procedures were more

i razvoja lečenja kila tokom vremena. Velika veličina uzorka takođe omogućava pouzdanu statističku analizu i daje mogućnost generalizacije rezultata na širu populaciju. Međutim, ograničenja uključuju potencijalne pristrasnosti prilikom retrospektivnog prikupljanja podataka i nemogućnost kontrole faktora koji bi mogli uticati na ishode hirurškog lečenja kila. Ograničena dostupnost detaljnih podataka o pacijentima ili faktorima rizika takođe može uticati na dubinu analize. Stoga, uprkos značajnim nalazima, ova ograničenja treba uzeti u obzir prilikom interpretacije rezultata i izvođenja zaključaka.

ZAKLJUČAK

Ova studija nije pokazala značajnu povezanost između ispitivanih faktora i recidiva kile, što podržava njegovu multifaktorijalnu prirodu. Inkarceracija je bila statistički značajno povezana sa tipom kile i nekoliko kliničkih i operativnih karakteristika, dok su se starija životna dob i prisustvo komorbiditeta pokazali kao nezavisni prediktori u multivarijabilnoj analizi. Pacijenti sa inkarceracijom imali su statistički značajno duži boravak u bolnici. Operativna tehnika bila je prvenstveno određena tipom kile i karakteristikama pacijenta, a ne nezavisnim uticajem na ishode. Ovi nalazi odražavaju ishode hirurškog lečenja kila u hirurškoj bolnici koja funkcioniše u uslovima ograničenih zdravstvenih resursa i naglašavaju značaj individualizovanog pristupa zbrinjavanju pacijenata.

Sukob interesa: Nije prijavljen.

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frequently performed under general endotracheal anesthesia, which is expected given the longer operative time, greater surgical complexity, and the need for optimal intraoperative conditions. Conversely, less demanding procedures were more often performed under local anesthesia, reflecting contemporary trends in hernia surgery and individualized perioperative management. Large prospective studies indicate that factors such as the size of the defect and the type of hernia have a dominant influence on the clinical course and the choice of therapy [25]. Finally, the identification of age and comorbidity as independent predictors of incarceration in multivariable analysis is consistent with the modern concept that systemic factors of the patient (general condition, chronic diseases) play a significant role in disease progression, even when individual clinical variables do not show significance in univariate analyses [22].

This research has a number of positive aspects but also challenges that require careful consideration. Among the advantages of the research, the longitudinal approach stands out, enabling the monitoring of the outcome of hernia operations. This analysis provides a deeper understanding of the trends and evolution of hernia treatment over time. Also, data that includes a large number of patients enables reliable statistical analysis and generalization of results to the wider population. However, challenges include potential biases in retrospective data collection, as well as the lack of ability to control for factors that could influence the outcomes of hernia surgeries. Limitations in the availability of detailed patient or risk factor information may also affect the depth of analysis. Therefore, despite the valuable findings, it is important to consider these aspects when interpreting the results and drawing conclusions.

CONCLUSION

In this study, no significant association was found between the examined factors and hernia recurrence, supporting its multifactorial nature. Incarceration was significantly associated with hernia type and several clinical and operative characteristics, while older age and the presence of comorbidities emerged as independent predictors in multivariable analysis. Patients with incarceration had significantly longer hospital stays. The choice of operative technique was primarily determined by hernia type and patient characteristics rather than representing an independent determinant of outcome. These findings reflect hernia surgery outcomes in a surgical hospital operating in a resource-limited healthcare setting and emphasize the importance of individualized patient management.

Conflict of interest: None declared

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