Comparative study of the immediate postoperative pain for the classical versus laparoscopic types of surgery within the treatement of inguinal hernias

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BACKGROUND: *The inguinal hernia is the protrusion of intra-abdominal contents through a defect of the abdominal wall. This content can be represented by omentum, most frequently intestine. Theoretically, any intraperitoneal organ can be located in the hernia sac.The inguinal hernia is distinguished by several features: it is the most common form of hernia, it can occur in any age category, the only treatment is the surgical treatment, in the absence of the treatment, severe complications can endanger the patient's life.The treatment of hernias consists either in the use of a classical ("open") surgical procedure or of a laparoscopic procedure. The objective of both procedures is to remove and treat the hernia sac and repair the defect that appeared in the posterior wall of the groin canal.*
OBJECTIVES: *The purpose of this study is to compare the effectiveness of the two surgery types, considering the immediate postoperative pain.*
METHODS: *This paper is a prospective study conducted between September 2019 and February 2020, including a number of 80 patients admitted in the Department of General Surgery I and II, Emergency Clinical County Hospital of Târgu Mureș. In the study were included patients with uncomplicated inguinal hernia for which a classical or laparoscopic procedure was performed. Patients with complicated inguinal hernia (strangulation, incarceration) and patients with associated comorbidities (neoplasms, autoimmune diseases, neurological disorders) were excluded. For the study group were taken into consideration: demographic data (age, gender), type of surgery and the pain assessment using the VAS scale.*
RESULTS: *Following the study, it was statistically confirmed the prevalence of elderly patients to the detriment of young patients in both classical and laparoscopic study group. As we age, the pain sensitivity decreases, an aspect highlighted in the classical study group, the statistics showing the presence of less pain in elderly patients on the second postoperative day compared to young patients. Regarding the pain in both postoperative days, it was statistically proved that the pain tends to decrease in intensity on the second postoperative day compared to the first postoperative day.*
CONCLUSIONS: *As seen from this paper, taking into consideration the pain aspect, the two surgeries are very similar. Regardless of the chosen type of procedure, a preponderance of elderly patients was observed. The "Open Tension Free" procedure is a modern and efficient technique due to the absence of the local tension that can generate recurrence. The laparoscopic procedure has the advantage of reducing surgical trauma and minimizing recurrences. In the end, the type of treatment should be chosen by the surgeon after taking into consideration the type of hernia, the age and the patient's comorbidities and the economic considerations.*

KEY WORDS: Classical procedure, Inguinal hernia, Laparoscopic procedure

Introduction

Inguinal hernia defines the protrusion of intra-abdominal contents through a defect of the abdominal wall. This content can be represented by omentum, most frequently intestine. Theoretically, any intraperitoneal organ can be located in the hernia sac. Among the retroperi-

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toneal organs, the bladder can be found intrasacular due to its proximal position [1]. Symptomatic inguinal hernias require surgical treatment as soon as possible to reduce the risk of incarceration. This occurs when the bowel remains trapped inside the hernia defect. It can become a strangulated hernia and thus the blood flow to the segment of the intestine involved will be compromised. Bowel necrosis can thus occur if it is not reduced within at least 6 hours from obstruction [2]. The indirect inguinal hernia is formed as a result of incomplete obliteration of the vaginal process. It passes down the inguinal canal lateral to the inferior epigastric artery, through the deep (internal) inguinal ring, often descending into the scrotum. This type of hernia is the most common, being found mainly in men, the hernia sac following exactly the path of the spermatic cord [4]. The direct inguinal hernia occurs in the Hesselbach's triangle, a region surrounded by the right abdominal muscle (medial), inguinal ligament (inferior) and inferior epigastric vessels (lateral). It passes medial to the inferior epigastric artery. A cause for this type of hernia is an increased intra-abdominal pressure, therefore it is an acquired condition [3]. Unlike indirect hernia, it has a minimal risk of incarceration or strangulation [5]. The treatment of hernias consists of using either a classical surgical procedure ("open") or a laparoscopic procedure. The purpose of both procedures is to remove and treat the hernia sac and repair the defect in the posterior wall of the groin. Repair can be done using the patient's own tissues or a heterogeneous material (eg polypropylene mesh), if the defect is large or the abdominal wall is very weak [6,7]. The advantages of using the two techniques vary from one study to another. The classical procedure proved to be less expensive, being performed under spinal or local anesthesia with the patient being discharged on the same day. Laparoscopic procedure is more expensive, requiring general anesthesia with longer hospitalization, but with minimal invasiveness and reduced postoperative pain. It is also extremely useful in the case of recurrent hernias, given the altered anatomy of the inguinal canal by previous approach and in the case of bilateral inguinal or femoral hernias [10]. The purpose of this study is to compare the effectiveness of the two surgery types (classical versus laparoscopic) used in the treatment of inguinal hernias, considering the immediate postoperative pain.

Methods

This paper is a prospective study conducted between September 2019 and February 2020, including a number of 80 patients admitted in the Department of General Surgery I and II, Emergency Clinical County Hospital of Târgu Mureș. In the study were included patients with uncomplicated inguinal hernia for which a classical or laparoscopic procedure was performed. Patients with complicated inguinal hernia (strangulation, incarceration) and patients with associated comorbidities (neoplasms, autoimmune diseases, neurological disorders) were excluded. For the study group were taken into consideration: demographic data (age, gender), type of surgery and the pain assessment using the VAS scale. The data was collected by direct anamnesis, observation sheet and operating protocol. The types of surgery were divided as follows: classical and laparoscopic. The standard classical intervention consisted of the Lichtenstein procedure (incision of the anatomical planes, opening of the inguinal canal, dislocation of the spermatic cord-in men, preparation of the hernial sac, plasty of the abdominal wall with mesh, suture of the anatomical planes). Laparoscopic intervention was done using the TAPP procedure (creation of pneumoperitoneum, introduction of trocars, incision of the parietal peritoneum, identification and resection of the hernial sac, placement of polypropylene mesh in the properitoneal space, suture of the parietal peritoneum). To assess the patient's postoperative condition, data was collected from the anamnesis and clinical assessment of the patient's pain intensity using the Visual Analogue Scale (VAS) on the first and second postoperative day.

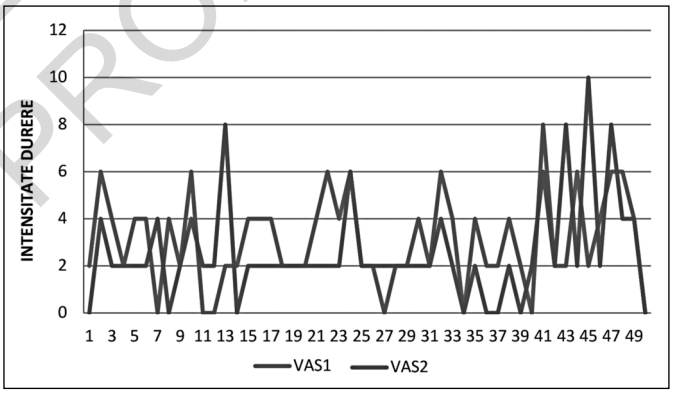

Fig. 1: VAS on the first and second postoperative day (classical procedure).

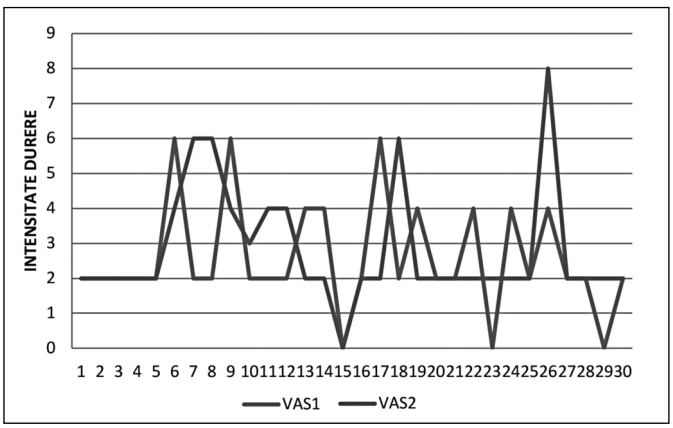

Fig. 2: VAS on the first and second postoperative day (laparoscopic procedure).

TABLE I - *The comparison of the average of the 2 study groups.*

	p-value
Age	0.0500
The number of hospitalization days	0.1672
VAS1	0.2646
VAS2	0.6226

TABLE II - *The correlation coefficient for the classical surgery study group.*

	Age	The number of hospitalization days	VAS1	VAS2
Age	–	0.0369	-0.1536	-0.2991
The number of hospitalization days		–	0.0661	0.0227
VAS1			–	0.3122
VAS2				–

TABLE III - *P-value.*

	Age	The number of hospitalization days	VAS1	VAS2
Age	–	0.799179	0.286885	0.286885
The number of hospitalization days		–	0.648336	0.87566
VAS1			–	0.027297
VAS2				–

Results

Regarding the study group , the distribution by age showed the preponderance of the 41-50 decade. In terms of gender distribution, males were up to 89%. The two types of surgery were quantified as follows: 50 classical cases and 30 laparoscopic cases. Regarding the localization, the hernias were distributed as follows: 45 right inguinal hernias, 29 left inguinal hernias, 6 mixed inguinal hernias. The values ™ of VAS1 and VAS2 for each type of surgery are shown in (Fig. 1) and (Fig. 2). No statistically significant correlation was observed between: the type of surgery and gender (p=0.78), the location of the hernia and gender (p=0.14; p=0.12), the age groups and gender (p=0.95), the addressability for classical and laparoscopic surgery (p=0.66).

The comparisons were made using the CHI test. Comparing the VAS1 and VAS2 averages using the STUDENT test, a statistically significant correlation was not obtained between the VAS evaluated in the first and second postoperative day in terms of the classical, laparoscopic procedure but also the group as a whole.

Comparing the averages of the two study groups for classical and laparoscopic procedure, using the STUDENT test, a statistically significant correlation was obtained between the age of the patients who undergone classical or laparoscopic surgery (p=0.05) but not in terms of the number of hospitalization days between the two classical and laparoscopic groups (p=0.17) or comparing VAS1 and VAS2 (p=0.26; p=0.62) (Table I). Regarding the correlation coefficient: in the classical surgery study group a statistically significant correlation coefficient was obtained in terms of age versus VAS2 and VAS1 versus VAS2 (Table II; Table III); in the laparoscopic surgery study group there were no statistically significant correlations.

Applying the Anova test, there was no statistical significance of: the VAS1 value in the classical study group in

TABLE IV - *Anova test.*

SUMMARY Groups	Count	Sum	Average	Variance
21-30	6	28	4.666667	10.66667
31-40	6	18	3	7.6
41-50	18	58	3.222222	5.24183
51-60	13	34	2.615385	2.25641
61-70	16	35	2.1875	0.295833
71-80	17	28	1.647059	2.117647
over 80	4	14	3.5	9
	80			

ANOVA Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	54.34628	6	9.057713	2.423435	0.034251	2.22559
Within Groups	272.8412	73	3.737551			
Total	327.1875	79				

terms of age group (p=0.38), the VAS1 value in the laparoscopic group in terms of age group (p=0.61), the VAS1 value in the classical and laparoscopic group in terms of age group (p=0.32), the VAS2 value in the classical group in terms of age group (p=0.06), the VAS2 value in the laparoscopic group in terms of age group (p=0.27) but there is a statistical significance of the VAS2 value in the classical and laparoscopic group in terms of age group (p=0.03) (Table IV).

Discussions

Following the study, it was statistically confirmed the preponderance of elderly patients to the detriment of young patients in both classical and laparoscopic study group. As we age, the pain sensitivity decreases, an aspect highlighted in the classical study group, the statistics showing the presence of less pain in elderly patients on the second postoperative day compared to young patients. Regarding the pain in both postoperative days, it was statistically proved that the pain tends to decrease in intensity on the second postoperative day compared to the first postoperative day. According to the statistical results, for the age group between 41-50 years, it was mainly opted for a laparoscopic surgery, while for the age group between 71-80 years, it was mainly opted for a classical surgery.

The classical procedure, Lichtenstein, is not difficult to learn while being performed under local anesthesia (learning curve, 5 cases), surgical residents being able to perform it without compromising the patient's care and long-term outcome. The procedure is safe, economical and requires a shorter operating time compared to the laparoscopic procedure. Also, the complications rate is low, thus becoming the gold standard in open hernias without tension [8,11]. Among the advantages of the Lichtenstein procedure are: the possibility of performing surgery under local anesthesia, it can be performed under spinal anesthesia, the ability to treat any type of inguinal hernia including large or complicated hernias, minimal risk of recurrence, reduced postoperative complications [11]. The laparoscopic procedure is meant for experts, the learning curve for it being long (200-250 cases). The severity of complications is higher and the long-term recurrence rate has not been determined. However, the TAPP technique or the TEPP technique may provide some benefits for certain patients, such as those with recurrent hernia after previous conventional open herniorrhaphy, those with bilateral hernias, or those undergoing laparoscopic surgery for other surgical procedures [12]. TEPP seems to have several advantages over TAPP, including: lower risk of intraperitoneal surgery, less intra-abdominal adhesions [13]. The difference between the classical and laparoscopic procedure consists in the access and exposure of the hernia defect. In the classical procedure, an incision is made to the abdominal wall in order to have access to the defect; this can lead to devascularization. When large incisions are used, a higher incidence of seromas, hematomas and infections of the incision site has been reported [40]. Although more technically complex, laparoscopy can be used to assess other defects or even synchronous inguinal hernias. However, the laparoscopic procedure has been criticized for not resecting the hernia sac and not restoring the anatomy, thus allowing the persistence of abdominal bulging and a mechanically unstable abdominal wall with uncoordinated muscles [14]. A meta-analysis of 880 patients who underwent primary laparoscopic versus primary classical interventions showed benefits of the laparoscopic approach, such as: reduction of infections, incisions, hospitalization, hematomas and pain. However, the laparoscopic procedure has the disadvantage of increasing the risk of enterotomies [14]. A meta-analysis performed in 2014 compared the laparoscopic procedure with the Lichtenstein technique in terms of treatment of recurrent inguinal hernia, concluding that the operating time was significantly longer in the case of the laparoscopic procedure, and the choice between the two approaches depended largely on availability of local expertise [23]. In a meta-analysis of randomized controlled trials comparing the laparoscopic procedure with the classical procedure in the treatment of inguinal hernias, Al Chalabi concluded that the short - and long - term results of the two approaches were extremely comparable [15]. The visual analog scale (VAS) allows an efficient, fast and simple quantification of pain with the advantage of minimal invasiveness and conceptual simplicity that allows easy training of the patient. The disadvantage of this scale is the one-dimensional quantification of pain [16].

Conclusions

Considering the appearance of pain, the two surgeries are similar. Regardless of the chosen type of procedure, a prevalence of elderly patients was observed. The "Open Tension Free" procedure is a modern and efficient technique due to the absence of the local tension that can generate recurrence. The laparoscopic procedure has the advantage of reducing surgical trauma and minimizing recurrences. In the end, the type of treatment should be chosen by the surgeon after taking into consideration the type of hernia, the age and the patient's comorbidities and the economic considerations.

Riassunto

L'ernia inguinale è la protrusione di parte del contenuto intra-addominale attraverso un punto di debolezza della parete addominale. Questo contenuto può essere rappresentato da omento, più frequentemente intestino. In teoria qualsiasi organo intraperitoneale può essere local-

izzato nel sacco erniario. L'ernia inguinale si distingue per diverse caratteristiche: è la forma più comune di ernia, può manifestarsi in qualsiasi categoria di età, l'unico trattamento è il trattamento chirurgico, in assenza del trattamento gravi complicazioni possono mettere in pericolo la vita del paziente. Il trattamento delle ernie consiste nell'uso di una procedura chirurgica classica ("aperta") o di una procedura laparoscopica. L'obiettivo di entrambe le procedure è rimuovere e trattare il sacco erniario e riparare il difetto che è apparso nella parete posteriore del canale inguinale.

Lo scopo di questo studio è confrontare l'efficacia dei due tipi di chirurgia, considerando il dolore postoperatorio immediato.

Si tratta di uno studio prospettico condotto tra settembre 2019 e febbraio 2020, comprendente un numero di 80 pazienti ricoverati nel Dipartimento di Chirurgia Generale I e II, Emergency Clinical County Hospital di Târgu Mureș. Nello studio sono stati inclusi pazienti con ernia inguinale non complicata per i quali è stata eseguita una procedura classica o laparoscopica. Sono stati esclusi i pazienti con ernia inguinale complicata (strangolamento, incarcerazione) e i pazienti con comorbilità associate (neoplasie, malattie autoimmuni, disturbi neurologici). Per il gruppo di studio sono stati presi in considerazione: i dati demografici (età, sesso), il tipo di intervento chirurgico e la valutazione del dolore utilizzando la scala VAS. Con questo studio è stata statisticamente confermata la prevalenza dei pazienti anziani rispetto a quelli giovani sia nel gruppo di studio classico che in quello laparoscopico. Con l'avanzare dell'età, la sensibilità al dolore diminuisce - aspetto evidenziato nel gruppo di studio classico - con la presenza di un minor dolore nei pazienti anziani in seconda giornata postoperatoria rispetto ai pazienti giovani. Per quanto riguarda il dolore in entrambe le giornate postoperatorie, è stato statisticamente dimostrato che il dolore tende a diminuire di intensità in seconda giornata postoperatoria rispetto alla prima giornata postoperatoria.

Conclusione: Prendendo in considerazione l'aspetto del dolore, i due interventi sono molto simili.

Indipendentemente dal tipo di procedura scelto, è stata osservata una preponderanza di pazienti anziani. La procedura "Open Tension Free" è una tecnica moderna ed efficiente per l'assenza della tensione locale che può generare recidive. La procedura laparoscopica ha il vantaggio di ridurre il trauma chirurgico e minimizzare le recidive. Alla fine, il tipo di trattamento dovrebbe essere scelto dal chirurgo dopo aver preso in considerazione il tipo di ernia, l'età e le comorbilità del paziente e le considerazioni economiche.

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