

A COMPARATIVE STUDY IN THE APPROACH OF INCISIONAL HERNIAS

Ana-Maria Donciu (Nichifor)*, T. Hangan, S. Chirila
Heka Hospital, Constanta

*Corresponding author. E-mail: ana_maria_nichifor@yahoo.com

A COMPARATIVE STUDY IN THE APPROACH OF INCISIONAL HERNIAS (Abstract): Incisional hernias are one of the most frequent forms of complications derived from postoperative wound complications and must be addressed surgically. One of the best techniques is the Rives-Stoppa technique, which is also suitable for open surgery and minimally invasive procedures. **Material and methods:** We conducted a study to evaluate the results of open or laparoscopic surgery using the Rives-Stoppa method. **Results:** We completed the survey over three years and assessed the outcomes for 49 patients, of which 13 were treated with open surgery and 36 by using the minimally invasive technique, the average age of the patients being $52,02 \pm 12,73$ years old. **Conclusions:** The results show a significantly more extended hospital stay for the patients with open surgery combined with a considerably higher proportion of complications. **Keywords:** SECONDARY PARIETAL DEFECTS, RIVES-STOPPA TECHNIQUE, ABDOMINAL WALL, EVENTRATION.

Incisional hernias are one of the most frequent post-operative complications of wounds, varying from 4% to 20% (1). Because the medial incision is the most frequent, most of the hernias are located at this level, some numbers suggesting 70-90% (2).

Initially described by Rives and Stoppa, this technique implies the incision of the skin and subcutaneous tissue, with the visualization of the sack and its release. After its opening, the viability of the content is verified, and intrasaccular and intraperitoneal adhesions are dissected. Next, the reconstruction of the parietal wall follows the saccular resection. Next, the posterior fascia of the rectus abdominis is opened on the medial margin, and a retro rectal avascular plane is created through good resection.

Here, the mesh is connected to the lateral margin of the muscle, where the vascular and nervous bundles are located.

The extraperitoneal method is done by repairing the hernial defect using extraperitoneal methods without opening the peritoneum (thus avoiding abdominal viscera and forming post-operative adhesions), is based on the procedures used in classic interventions and described by Rives and Stoppa. The techniques were first described in France by Dulucq J.L. (3-5), who used a surgical abutment of the dissection of the peritoneal space, followed by McKernan and Laws in 1993, which used the trocar with a dissecting balloon (6).

The advantage of using these techniques resides in intraabdominal pressure, which acts on the mesh's surface and fixates the

A comparative study in the approach of incisional hernias

prosthetic material on the muscular plane. As a result, the laparoscopic anatomy of the region is seen differently from the classic anatomy. But, first, the surgeon must identify critical anatomical landmarks for incisional hernias. This study aims to evaluate the differences in recovery time and complications for patients with a hernia that are treated by using classic versus minimally invasive Rives-Stoppa techniques for eventrations.

MATERIAL AND METHODS

The prospective study was conducted on 49 patients treated for eventrations, over three years, between 2018 and 2021. Based on medical characteristics, patients were assigned to either classic or minimally invasive intervention (laparoscopic or endoscopic).

At the initial consult, we measured the socio-medical characteristics of the patients (age, sex, environment, weight, localization of the hernia, and comorbidities). Then,

following the surgical procedures, we followed up with the patients and gathered data on their evolution, hospitalizations, and complications.

We used descriptive statistics, mean and standard deviation for continuous, numerical values, and counts (with percentages) for categorical variables. The tests used for determining the statistical significance of the results were adapted to the type of variable based on the existing general recommendations (7). For example, a “p” value less than 0.05 was considered statistically significant.

RESULTS

Characteristics of the sample

Table I summarizes the characteristics of the patients at admission. As can be observed, there are no statistically significant differences between the two groups of patients that underwent Rives-Stoppa intervention compared to the ones with minimally invasive interventions.

TABLE I.
Characteristics of the patients

	Total (49)	Minimally invasive (36)	Classic(13)	p-value
Age				
Mean ± SD	52.02 ± 12.73	50.33 ± 13.71	56.69 ± 8.24	0.12
Sex				
Male	25 (51%)	19 (52.8%)	6 (46.2%)	0.68
Female	24 (49%)	17 (47.2%)	7 (53.8%)	
Environment				
Urban	37 (75.5%)	28 (77.8%)	9 (69.2%)	0.54
Rural	12 (24.5%)	8 (22.2%)	4 (30.8%)	
Weight				
Mean ± SD	88.35 ± 15.55	90.39 ± 14.89	82.69 ± 16.51	0.13
Localization				
Supraumbilical	23 (46.9%)	18 (50%)	5 (38.5%)	0.58
Umbilical	10 (20.4%)	6 (16.7%)	4 (30.8%)	
Subumbilical	14 (28.6)	10 (27.8%)	4 (30.8%)	
Inguinal	2 (4.1%)	2 (5.6%)	0 (0%)	
Size of the defect (cm)				
Mean ± SD	12.22 ± 6.4	10.03 ± 4.8	18.31 ± 6.5	<0.01

The average age of the patients was 52.02 years, with a standard deviation of 12.73 years. We observed that the average for the patients with minimally invasive interventions was more than six years smaller than those for whom the Rives-Stoppa intervention was used.

Even though there was a difference in the proportion of males and females, with a higher percentage of males being operated on using minimally invasive techniques, the results were not statistically significant.

At first sight, the proportion of patients according to the environment might give the impression that there is a significantly larger of patients living in urban areas. However, for the whole sample of patients, 69.2% were from urban areas. Considering where the patients come from, an acceptable percentage is in South-East Romania. According to official data, about 70% of the people live in urban areas, thus making these numbers normal. Regarding

the localization of the hernia, again, there are no statistically significant differences ($p=0.58$) between the two groups. For minimally invasive interventions, half of them were supra-umbilical. When the hernia was in the umbilical area, the percentage of Classic-type interventions was almost double in frequency (30.8%) compared to the frequency of umbilical hernia for patients treated using minimally invasive techniques (16.7%). Also, for larger hernias, the classic intervention was preferred. The average size of the abdominal wall defect is almost double for patients treated using traditional interventions. When comparing the frequency of comorbidities at admissions, we observe essential differences in proportions regarding high blood pressure and obesity, cases in which minimally invasive techniques were preferred (tab. II). However, differences were not statistically significant ($p=0.1$).

TABLE II.
Comorbidities

	Classic	Minimally Invasive	Total
Atrial Fibrillation	1 (7.7%)	0 (0%)	1 (2%)
Cardiac Insufficiency	1 (7.7%)	2 (5.6%)	3 (6.1%)
Diabetes Mellitus Type 1	1 (7.7%)	0 (0%)	1 (2%)
Diabetes Mellitus Type 2	1 (7.7%)	0 (0%)	1 (2%)
High Blood Pressure	2 (15.4%)	9 (25%)	11 (22.4%)
Obesity	2 (15.4%)	13 (36.1%)	15 (30.6%)
Pulmonary Tumor	1 (7.7%)	0 (0%)	1 (2%)
Thyroiditis	0 (0%)	1 (2.8%)	1 (2%)
No comorbidity	4 (30.8%)	11 (30.6%)	15 (30.6%)

Post-surgery evolution

We analyzed the way patients evolved following the surgical intervention. We

observed an almost four times higher percentage of complications following the Classic techniques than minimally invasive

A comparative study in the approach of incisional hernias

procedures. The difference was statistically significant ($p=0.01$), suggesting an increased association between the Classic method and the appearance of complications (fig. 1).

When analyzing the days of hospitalization, the mean value for the number of

hospitalization was 2.72 ± 0.944 days for the minimally invasive techniques and significantly higher, with an average of 4.69 ± 1.18 days for the patients for which Classic styles was used (tab. III). The difference was statistically significant, with $p<0.001$.

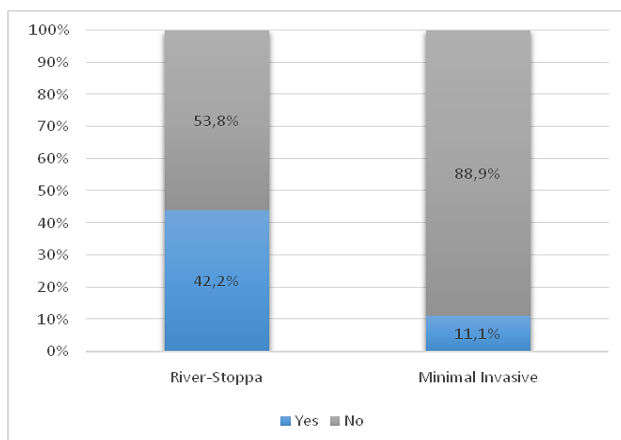


Fig. 1. Proportion of complications after the surgical intervention

TABLE III.

Descriptive analysis – days of hospitalization

Days of hospitalization	Type of Surgical Intervention		
	Classic	Minimally Invasive	Total
N	13	36	49
Mean	4.69	2.72	3.24
Std. Deviation	1.182	.944	1.331
Median	4.00	2.50	3.00
Minimum	3	2	2
Maximum	7	5	7
Skewness	1.065	1.465	1.075

DISCUSSION

Our study focused on identifying differences in the evolution of patients with an incisional hernia, depending on the surgical interventions used (Classic or Minimal Invasive). The Rives-Stoppa technique offered excellent long-term results in patients with large hernias (primary of incisional) (8).

Our study's sample population consisted of patients with different degrees of incisional hernias. We observed no statistically significant differences in patients within the arms of the study. Even though there is a very high percentage of patients within the urban area, this is considered normal for where the study took place, so we cannot say that there are issues related to health

inequalities, as observed in other studies or on different types of pathologies. (9, 10).

The primary outcome of the study was the presence of post-surgery complications.

Complications were observed in a relatively large number of patients treated with Classic intervention (42.2%) compared to Minimally Invasive methods (11.1%). The Classic intervention represented the complications caused by suppurations, hematomas, or seromas. In the case of Minimally Invasive interventions, the complications were described by local pain and thread granuloma.

Considering that the patients presented with incisional hernias, with one-quarter previously treated for hernia, we believe the observed results are within typical values. Other studies reported similar rates of complications, with significant variability (11, 12). Differences in the percentage of complications may also appear because of the difference in the size of the treated eventration, open surgery being preferred in the case of more significant abdominal wall defects.

The economic aspect is also essential when analyzing surgery outcomes. For example, using Minimally Invasive techniques, not only did the patients have significantly fewer complications, but the length of hospital stays was significantly

reduced, from a median of 4 days (open surgery) to a median of 2.5 in the case of Minimally Invasive techniques, this represents one of the significant advantages of Minimally Invasive techniques (13, 14).

The present study adds to the existing literature by comparing surgical techniques for incisional hernias. Compared to open surgery, we demonstrated that minimally invasive procedures have better results in terms of recovery time and lack of complications.

We would have compared patients with eventrations of similar sizes for a better comparison. Also, the study focuses on immediate complications without considering possible recurrent hernias that can appear in time.

CONCLUSIONS

The minimally invasive approach offers shorter recovery time, thus decreasing the length of the hospitalization, with all the associated benefits and lower percentages and seriousness of the complications.

CONFLICT OF INTEREST AND FUNDING

The authors declare that there is no conflict of interest, and they received no specific funding regarding this scientific research.

REFERENCES

1. Dietz UA, Menzel S, Lock J, Wiegering A. The Treatment of Incisional Hernia. *Dtsch Arztebl Int* 2018; 115(3): 31-37.
2. Angelici AM, Perotti B, Dezzi C, *et al.* Measurement of intra-abdominal pressure in large incisional hernia repair to prevent abdominal compartmental syndrome. *G Chir.* 2016; 37(1): 31-36.
3. Dulucq JL. Treatment of inguinal hernia by insertion of a subperitoneal patch under preperitoneoscopy. *Chirurgie* 1992; 118(1-2): 83-85.
4. Schwarz J, Reinhold W, Bittner R. Endoscopic mini/less open sublay technique (EMILOS)-a new technique for ventral hernia repair. *Langenbecks Arch Surg* 2017; 402(1): 173-180.

A comparative study in the approach of incisional hernias

5. Losi P, Burchielli S, Spiller D, *et al.* Cyanoacrylate surgical glue as an alternative to suture threads for mesh fixation in hernia repair. *J Surg Res* 2010; 163(2): e53-e58.
6. McKernan JB, Laws HL. Laparoscopic repair of inguinal hernias using a totally extraperitoneal prosthetic approach. *Surg Endosc* 1993; 7(1): 26-28.
7. Evelyn Malone H, Coyne I. Decision-tables for choosing commonly applied inferential statistical tests in comparative and correlation studies. *Nurse Res* 2019; 27(4): 29-35.
8. Bauer J, Harris M, Gorfine S, Kreel I. Rives-Stoppa procedure for repair of large incisional hernias: experience with 57 patients. *Hernia* 2002; 6(3): 120-123.
9. Stefanopol IA, Baroiu L, Chirila S, *et al.* The Influence of Living in Rural Areas on the Evolution and Management of Pediatric Ovarian Cystic Lesions: A Retrospective Study on a Cohort from South-eastern Romania. *Int J Gen Med* 2022; 15: 5273-5284.
10. Duma OO, Roşu ST, Manole M, *et al.* Disparities in the access to primary healthcare in rural areas from the county of Iasi Romania. *Med Surg J-Rev Med Chir Soc Med Nat Iasi* 2014; 118(3): 743-748.
11. Clark CJ, Fisher M, Walker G, Muscarella P. Rives-Stoppa retromuscular repair for incisional hernias. *Journal of Surgical Research* 2006; 130(2): 245-246.
12. Langer C, Liersch T, Kley C, *et al.* Erfahrung in der Narbenhernienchirurgie. *Der Chirurg*. 2003; 74(7): 638-645.
13. Zhang Y, Zhou H, Chai Y, Cao C, Jin K, Hu Z. Laparoscopic Versus Open Incisional and Ventral Hernia Repair: A Systematic Review and Meta-analysis. *World Journal of Surgery* 2014; 38(9): 2233-2240.
14. Soliani G, De Troia A, Portinari M, *et al.* Laparoscopic versus open incisional hernia repair: a retrospective cohort study with costs analysis on 269 patients. *Hernia* 2017; 21(4): 609-618.