ROLE OF THE PROSTHETIC MEDICAL DEVICES IN MANAGEMENT OF ABDOMINAL PARIETAL DEFECTS

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ROLE OF THE PROSTHETIC MEDICAL DEVICES IN MANAGEMENT OF ABDOMINAL PARIETAL DEFECTS (Abstract): Management of abdominal parietal defects is a major public health concern, both nationally and internationally, due to morbidity, mortality, loss of function, decreased quality of life and loss of work capacity. **The aim** of this retrospective study is driven by the current possibility of treating abdominal parietal defects by prosthetic medical devices with various high-performance synthetic materials. **Material and methods:** The approach is from a statistical and multifactorial point of view in patients with abdominal parietal defects treated with prostheses in the I and II Surgery Clinics of "Sf. Spiridon" County Clinical Emergency Hospital Iaşi for a period of 15 years. The information was retrospectively obtained from the register of the hospital secretary and from the observation sheets, analyzing the cases on the basis of the multiple criteria. **Results:** The statistical analysis of the selected cases revealed that at a number of 5865 of abdominal wall defects surgeries that were performed in our clinics between 01.01.2006–01.07.2021 we recorded 3029 inguinal hernias (52%), 220 femoral hernias (4%), 796 umbilical hernias (13%) and 1820 incisional hernia (31%). The information on the main diagnosis associated with the 1820 subjects shows that most patients were hospitalized with the diagnosis of ventral hernia, 1122 cases without occlusion or gangrene (61.64%), 522 cases with obstruction (28.68%) and 176 cases with gangrene (9.6%). Obesity was the most common factor of risk for an abdominal wall defect with an index of 29%. The highest incidence of the develop of an incisional is reported on the midline, respectively 74%. **Conclusions:** Management of abdominal parietal defects is a major public health concern. Early diagnosis, easily accessible health facilities and health education are important to prevent complications and improve quality of life. **Keywords:** ABDOMINAL WALL DEFECTS; HERNIA; INCISIONAL HERNIA; PROSTHETIC MEDICAL DEVICES.

Management of abdominal parietal defects is a major public health concern, both nationally and internationally, due to morbidity, mortality, loss of function, decreased quality of life and loss of work capacity.

The first description of a hernia appears in the Ebers Papyrus in Egypt in 1550 BC.

There is evidence of hernia surgery since antiquity, with Hippocrates describing the umbilical hernia in 460-374 BC. This pathology is an ongoing concern, with the development of multiple surgical techniques over the years. The "modern" era of surgical treatment of hernia begins in 1958, when the procedure with polyethylene mesh (Marlex-50) was introduced by FC Usher, used in the case of inguinal hernias, and in 1984 Liechtenstein established the gold standard with the technique "tension-free", followed in 1992 by the development of laparoscopic techniques (1).

There is no universally valid definition of abdominal parietal defect, this may include recurrent or non-recurrent hernias, incisional hernias and eviscerations. A hernia is defined as the protrusion of a viscera, or anatomical tissue, through an existing or acquired orifice in the abdominal wall. Incisional hernia refers to abdominal wall hernia at the site of a previous surgical incision (2). Of the total interventions for the surgical treatment of parietal defects, in 60% of cases the prosthetic material used is mesh type and in 40% combined systems are used (3).

Incisional hernia develops in 11-20% of patients with laparotomy history, complicated with incarceration in 6-15% of cases and strangulation in approximately 2%. The recurrence rate after primary suture surgery is cited in approximately 54% of cases, up to 58% for tissue procedures and 20% for alloplastic procedures (4).

MATERIAL AND METHODS

The purpose of this retrospective study is driven by the current possibility of treating abdominal wall defects by prosthetic medical devices with various high-performance synthetic materials. The approach is from a statistical and multifactorial point of view of the parietal defects treated by prosthetic medical devices in the period 01.01.2006–01.07.2021, in the I and II Surgery Clinics of "Sf. Spiridon" County Clinical Emergency Hospital Iaşi.

The information was retrospectively obtained from the register of the hospital secretary and from the observation sheets, analyzing the cases on the basis of the following criteria:

- Age
- Sex
- Associated diseases
- Type of prosthetic medical devices
- Number of hospital days
- Immediate, remote, local, general complications

Regarding the analysis of cases with postoperative incisional hernia, the following criteria were also taken into account:

- The size of the parietal defect
- Number of previous incisions
- Type of initial incision.

The data systematized in this study was used in the analysis of the incidence of abdominal parietal defects in relation to the number of laparotomies performed in the two clinics, risk factors for the occurrence of the defect, recurrence and the occurrence of postoperative incisional hernia. These values should not be considered as an assessment of maximum accuracy, as it should be borne in mind that some patients come from outside the hospital area and others, with laparotomy events performed in the two clinics, may have turned to other surgical services. Another category of patients is represented by those patients with well-tolerated small abdominal parietal defect who did not request surgical consultation, remaining outside the evidence that was analyzed in this study. All data was collected in full acknowledgement of GDPR regulations and confidentiality, from hospital registry (5, 6).

Statistical analysis was performed as

case-control analyses, without adjustment for multiple testing, with nominal significance defined as $p<0.05$. Continuous variables were described using ANOVA test. The quantitative differences between the two groups were established with t-Student test. The categorial demographic data were compared using the Chi-2 test. The ROC curve (Receiver Operating Characteristics) helps us to measure the efficiency of a model, by drawing the specificity / sensitivity balance as a prognostic factor. The larger the area under the curve (the maximum is 1) the better the model.

RESULTS

The statistical analysis of the selected cases revealed that at a number of 5865 of abdominal wall defects surgeries that were performed in our clinics between 01.01.2006–01.07.2021 we recorded 3029 inguinal hernias (52%), 220 femoral hernias (4%), 796 umbilical hernias (13%) and 1820 incisional hernia (31%), (fig. 1).

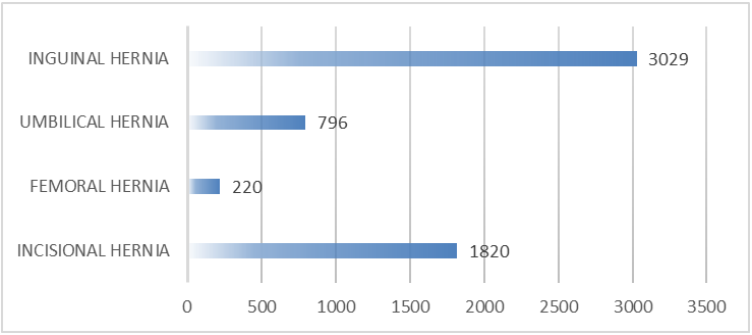


Fig. 1. This is a figure. Schemes follow the same formatting.

The data was analyzed in relation to the main local and systemic risk factors that interfere with the occurrence of the parietal defect.

Risk factors in the appearance of abdominal wall defects

• *Age and sex*

Patient gender data show the numerical difference between the sexes, which corresponds to a ratio of 2: 1 in favor of women in incisional hernia cases. This explained by the more frequent presence in females of risk factors conductive to postoperative parietal defects: decreased muscle tone after multiple pregnancies, obesity, weaker musculoskeletal layers, more frequent surgery on the lower abdomen as pelvic surgery, caesarean section, hysterectomies (tab. I).

TABLE I.

Incidence of inguinal hernias according to demographical data

	All groups N=5865	Incisional hernia N=1820	Other abdominal parietal defects N=4045	P values
Demographic data				
Age, mean±SD y (limits)	60.56±11.37 (17-98)	61.85±9.24 (30-96)	59.97±12.17 (17-98)	0.001*
Female, n(%)	2083 (35.5%)	1195 (65.7%)	888 (22.0%)	0.001**
≥ 60 years	3163 (53.9%)	1085 (59.6%)	2078 (51.4%)	0.001**

* t-student test ** chi2 test.

In inguinal hernia cases the main reason why men are more prone to inguinal hernias, both direct and indirect is due to reproductive anatomy and the inguinal canal in women is narrower., with a ratio of 8:1 (7.6:1) in favor of men. The umbilical hernia has a ratio of 1:1, and the femoral hernia has a ratio of 4:1 (3,6:1) in favor of women, because of the wider shape of the female pelvis (p=0.001) (fig. 2).

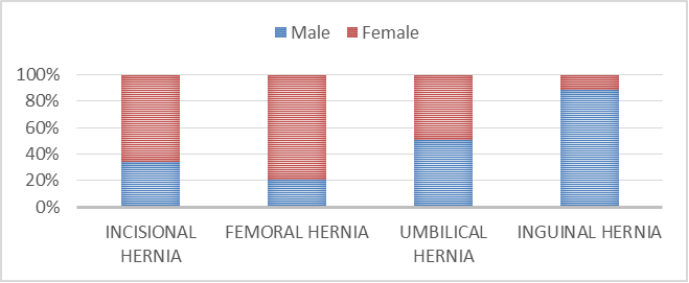


Fig. 2. Sex distribution by diagnosis.

The average age was highest in the group with femoral hernia and the lowest in the group with umbilical hernia (67.13 vs 57.97; p=0.001) (fig. 3).

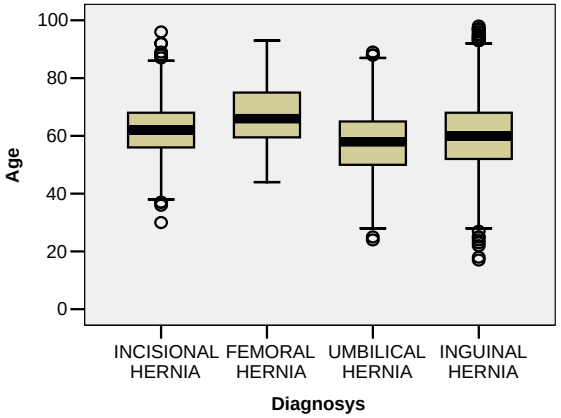


Fig. 3. Mean age by diagnosis.

Associated diseases

A hernia is often caused when there is a history of a hernia in the family. Straining your muscles due to intense weightlifting or coughing and even pregnancy may cause a hernia. When there is pressure on the abdominal area can lead to a hernia. Even issues like constipation, urinary obstruction along with chronic cough are risk factors. Obesity is also a major risk factor. As a hernia is caused when the tissue or part of muscle pushes out, damage to the elasticity and the strength of the tissue can also be a factor causing a hernia. Also, it may be due to residual embryological channels which is generally what a person is born with,

causing a congenital hernia.

Organic strains were found in a percentage of 62% being represented by various organo-systemic and metabolic disorders (fig. 4). Among the organic disfunctions mentioned, obesity was the most common with an index of 29%. Data on organo-systemic and metabolic disorders as individual risk factors provide an incomplete picture of their influence on the frequency of postoperative events. For a more rigorous interpretation it would be necessary to take into account their cumulative and synergistic effects.

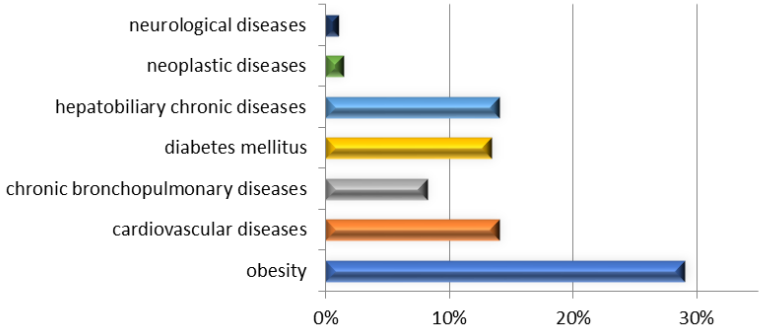


Fig. 4. Organo-systemic and metabolic disorders.

Obesity occurs more frequently under 60 years, muscle-aponeurotic structures begin to lose strength (table 2), chronic cardiovascular, lung disease and diabetes occur more frequently, and in women, the onset of menopause can trigger endocrine and metabolic disorders with a resounding decrease in the strength of supporting connective tissue (tab. III).

The repair of skin defects is incomplete and unfeasible in the elderly where epithelialization is delayed and limited, the vascular network recovers slowly and poorly, and the basement membranes recover abnormally. The scar tissue of the old man is younger compared to that of the body's original skin, the scar remaining immature for a long time.

TABLE II.

Organo-systemic and metabolic disorders by age group in patients with incisional hernia

Organo-systemic and metabolic disorders	< 60 years (n=625)	≥ 60 years (n=1195)	P values for Chi² test	OR	CI 95%
Obesity	369 (50.2%)	519 (47.8%)	0.321	1.06	0.95-1.18
Cardiovascular	359 (48.8%)	513 (47.3%)	0.513	1.04	0.93-1.16
Lung disease	228 (31.0%)	325 (30.0%)	0.628	1.03	0.91-1.16
Diabetes	340 (46.3%)	483 (44.5%)	0.464	1.04	0.93-1.17
Hepatobiliary	266 (36.3%)	402 (37.1%)	0.709	0.98	0.87-1.10
Neoplasic	126 (17.1%)	190 (17.5%)	0.838	0.99	0.85-1.14
Neurological	127 (17.3%)	192 (17.7%)	0.818	0.98	0.85-1.14

TABLE III.

Organo-systemic and metabolic disorders by sex in patients with incisional hernia

Organo-systemic and metabolic disorders	Female (n=1195)	Male (n=625)	P values for Chi² test	OR	CI 95%
Obesity	584 (48.9%)	304 (48.6%)	0.962	1.00	0.82-1.20
Cardiovascular	585 (49.0%)	287 (45.9%)	0.218	1.04	0.98-1.11
Lung disease	373 (31.2%)	180 (28.8%)	0.287	1.04	0.97-1.12
Diabetes	541 (45.3%)	282 (45.1%)	0.951	1.01	0.94-1.07
Hepatobiliary	441 (36.9%)	227 (36.3%)	0.806	1.01	0.94-1.08
Neoplasic	200 (16.7%)	116 (18.6%)	0.331	0.96	0.87-1.05
Neurological	203 (17.0%)	116 (18.6%)	0.404	0.96	0.88-1.05

The period of maturation and integration of the scar is double or even triple in duration in the elderly, and the resulting scar is worse than in the young, the evolution being able to be interrupted by lesions with secondary healing.

• *The influence of number of previous interventions in incisional hernia cases*

From a total of 1820 patients, 46.3% had previously undergone two or more surgeries on the abdominal wall for various conditions, all with at least one attempt at surgery to treat an incisional hernia by simple parietal suture and autoplastic methods or by prosthetic medical devices.

The number of surgeries performed on the abdominal wall recorded in the history of patients in the study group are shown below (fig. 5).

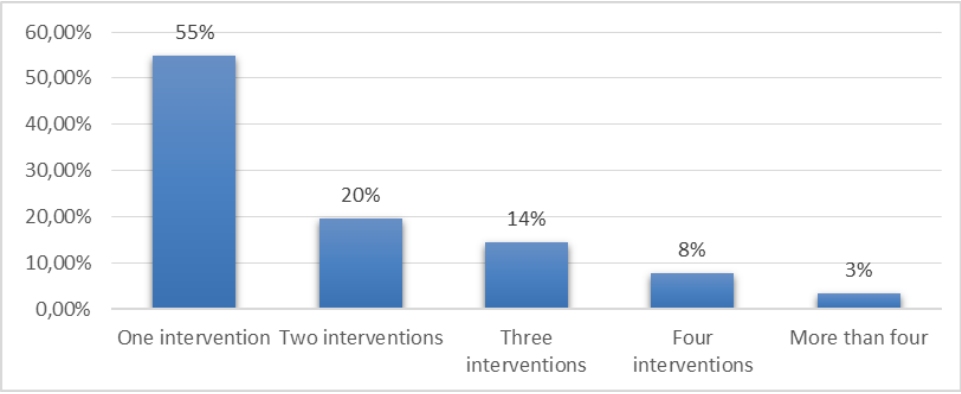


Fig. 5. Distribution of incisional hernia cases by history of previous surgeries.

• *Topography of the parietal defect*

The approach to resolving the condition of origin of the current parietal defect generally followed the place of establishment of the incisional hernia.

Some topographic regions predispose to parietal scarring defects either by the distribution of aponeurotic-fascial structures in the superficial planes and enduring a constantly positive intra-abdominal pressure (sub umbilical region), or by high tension in the scar caused by the presence

of close bone marks. However, the highest incidence is reported on the midline, respectively 74%. This is explained by the fact that the median laparotomy offers the best comfort in resolving surgical emergencies, being preferred by most surgeons. The topography of the parietal defect overlapped in most patients (~97%) with that of the last laparotomy performed.

The information on the main diagnosis associated with the 1,820 subjects shows that most patients were hospitalized with the diagnosis of ventral hernia, 1,122 cases without occlusion or gangrene (61.64%), 522 cases with obstruction (28.68%) and 176 cases with gangrene (9.6%).The appearance of the current event finds its explanation in a series of elements related to:

• Conditions in which the laparotomy (emergency or election) was performed.

• The lesions encountered and how to resolve them.

• Incidence of the infectious process and contamination or not of the parietal wound.

• Quality of parietal strength structures.

• Anesthetic conditions under which the operation was performed,

• Reaction to the suture material used (intolerance, granulomas).

The recurrence of the events poses problems of surgical resolution of the musculo-aponeurotic gap and difficulty in choosing the right method of restoring the wall to avoid a new recurrence. It, and especially the multi-recurrence, draws attention to the cumulation in the same patient of several local and general risk factors that must be taken into account when choosing the treatment method.

A new attempt to repair the wall by the same methods used previously without results is illusory and will further compromise the local anatomical structures.

Regarding recurrence, in just over half of the cases there were primary events (1,010 and 55.5%, respectively) and a number of 810 patients had multiple recurrent incisional hernia. In 18% of patients, it was intervened in the antecedents 2 or more times by classical methods of suturing the edges of the parietal defect.

• *The size of the parietal defect*

Another risk factor that may influence the therapeutic outcome is the size of the parietal defect (fig. 6).

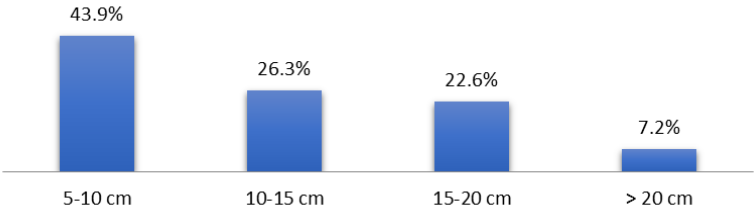


Fig. 6. Distribution of incisional hernias according to the size of the parietal defect.

About 7% of patients with incisional hernia were over 60 years old, female, and had complications (tab. IV).

ROC curve not confirmed age (AUC=0.479; IC95%: 0.453-0.506; p=0.131), gender (AUC=0.498; IC95%: 0.471-0.525; p=0.875) and presence of complications (AUC=0.494; IC95%: 0.468-0.521; p=0.685) as good predictors of a high size of parietal defect (fig. 7).

TABLE IV.
Size of parietal defect in relation with characteristics in patients with incisional hernia

Characteristics	Size of parietal defect				P value for Kruskal-Wallis test
	> 20 cm	15-20 cm	10-15 cm	5-10 cm	
Age ≥ 60 y	78 (7.2%)	261 (24.1%)	284 (26.2%)	462 (42.6%)	0.439
Female	83 (6.9%)	271 (22.7%)	317 (26.5%)	524 (43.8%)	0.898
Complicated	55 (7.5%)	159 (21.7%)	192 (26.2%)	328 (44.7%)	0.659

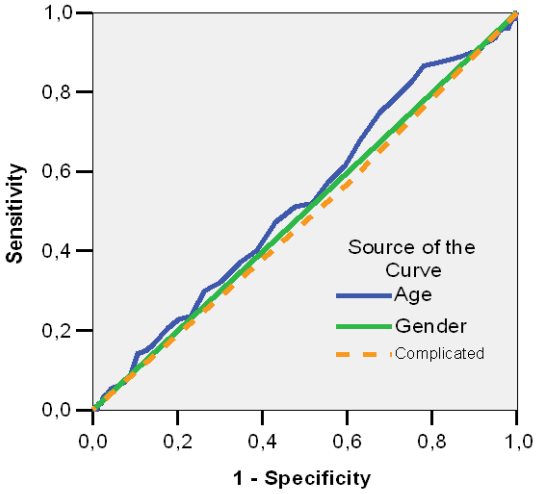


Fig. 7. ROC curve. Epidemiological data predictors of parietal defect size.

Prosthetic methods and techniques used

The chosen method depends mainly on the size of the parietal defect, but with the diversification of the available prosthetic materials, it became necessary to correlate the characteristics of the mesh with the technique of abdominal repair.

Polypropylene nets (PP) are the most widely used. It does not stimulate the immune response or rejection, being quickly incorporated by fibroblasts and granulation tissue that passes easily and fills the spaces between the nodes. Due to the low porosity, the chances of bacteria colonizing are low and the infections exceptional.

Multifilament polyester (PET) yarns are made of soft, fine, soft, durable and elastic nets. In addition, they can be adapted to all shapes and surfaces. The structure of the thread is responsible for the greater tissue inflammatory response than that of the propylene mesh.

In order to eliminate material incompatibilities, it is recommended that the non-absorbable nets (PP, PET) be sutured with non-absorbable threads, preferably from the same material from which the mesh is made.

The most commonly used composite mesh are the double layer: PP with Vicryl

type layer (resorbable copolymer based on glycolic acid and lactic acid) or with non-absorbable layer of e-PTFE (expanded polytetrafluoroethylene-expanded Teflon). Such nets have the advantage of weak adhesions that are established with the abdominal organs when they come in contact with them, but they are more expensive.

The treatment of events in the case of the patients in the analysis group was mainly based on polypropylene prosthetic materials several polyester mesh and more recently, composite mesh, implanted at different stratigraphic levels.

We treated 6 selected cases of incisional hernia by laparoscopic abord. The incisional hernia was positioned in 2 cases in the abdominal midline, 2 cases in the right inguinal fossa, and 2 cases in the umbilical region.

The patients were placed in the lithotomy position and then in the Trendelenburg position (30°). An open technique of creation of pneumoperitoneum was used, at a 12-14 mmHg intra-abdominal pressure. The vital signs (ECG, non-invasive blood pressure measurement, inspired O_2 concentration, tidal volume, airway pressure, pulse oximetry, capnography, temperature) were recorded during surgery, but there was no change in vital parameters after the abdomen was insufflated with carbon dioxide at this pressure. The video monitor placed on an instrument tower at eye level, on the right side of the patient, in front of the main surgeon. To facilitate instrument manipulation along with adequate visualization during laparoscopy, trocars usually are placed in triangular fashion termed triangulation, as far as possible from the site of expected adhesions. The 11 mm optical trocar was placed in the left hypochondrium, as far as possible laterally from the defect to provide clear visualization of the defect margins, and 3 other trocars (10 mm and 2 of 5 mm). Adhesiolysis was limited to the expected landing zone of the mesh on the peritoneal surface of the abdominal wall (fig. 8).

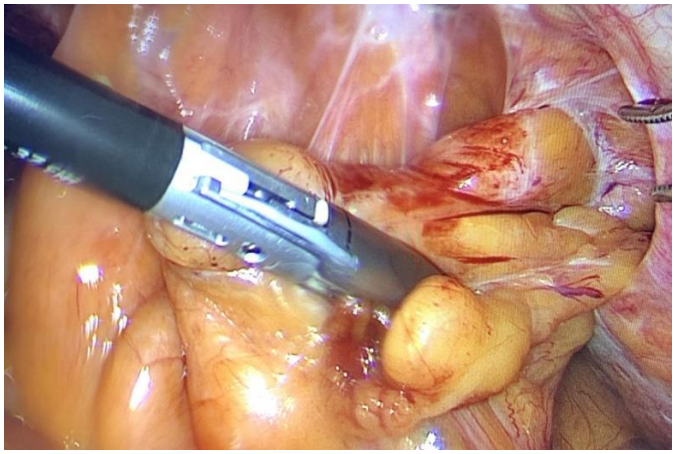


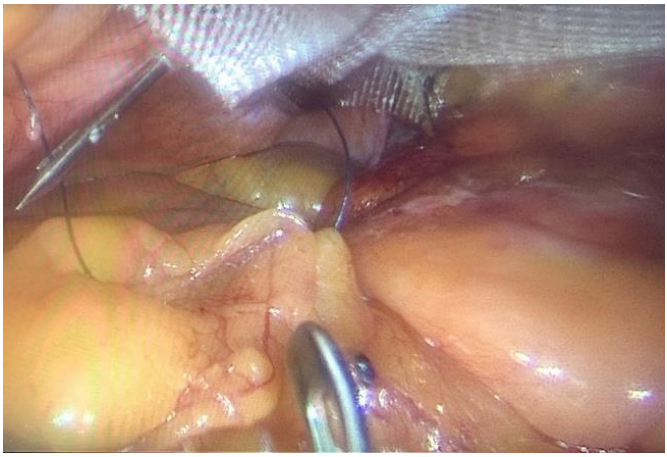
Fig. 8. Adhesiolysis of the incisional hernia.

We used polypropylene prosthetic medical device introduced in the abdomen through the 10-mm trocar site, avoiding contact with the skin. The omentum was used as a protective layer over the viscera in repair of the incisional hernias using on-lay technique.

Sutured was performed with an overlap of 3-5 cm of the borders by using a non-absorbable suture material trans-percutaneous in 4 patients, using a Reverdin needle (fig. 9A) and metallic tackers fixation in 2 patients placed at intervals of 1.5 cm (fig. 9B).

The interventions were uneventful, without devitalized or injured small intestine during de dissection of the incisional hernia sac.

A.



B.

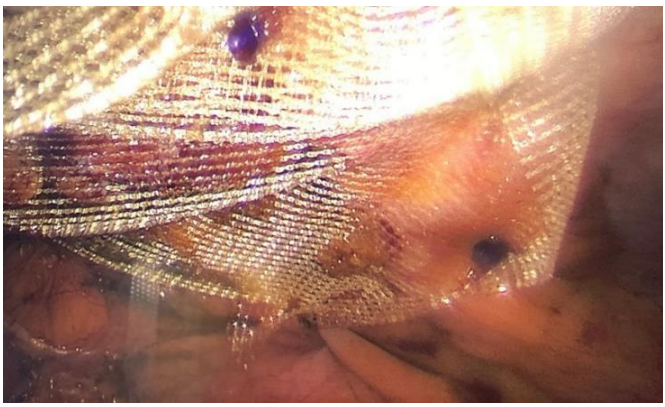


Figure 9. A. Trans-percutaneous suture of the prosthetic medical device.
B. Metallic tackers fixation of the prosthetic medical device.

Postoperative morbidity

Postoperative morbidity was divided into three evolutionary stages: (i) immediate morbidity (first 48 hours postoperatively); (ii) early morbidity (first 30 days postoperatively); (iii) late morbidity (more than 30 days after surgery).

- Immediate morbidity - the immediate postoperative course was simple in 1,743 patients (95.8%) and with general and local complications in 76 cases (4.2%).
- The general complications registered a percentage of 3.8% (N=3) being represented by:
- 32 postoperative respiratory failures in patients with known chronic bronchopulmonary disease, which required respiratory surveillance.

- 16 dynamic postoperative ileus remitted after medical treatment.
- 24 febrile ascents (38 ° C) in patients who subsequently had suppuration of the surgical wound.
- Early morbidity - overlaps, over time, with postoperative hospitalization- in the first 30 days after the operation, 1678 patients (92.2%) had a simple evolution, and 142 (7.8%) developed general and local complications.

The death occurred in 4 patients. However, the patients were with associated: severe sepsis, postoperative parietal hematoma, acute postoperative coronary syndrome, mechanical ventilation-associated tracheobronchitis, left carotid chronic ischemic stroke, right hemiplegia, atrial fibrillation, essential hypertension, acute renal failure and acute renal failure.

Local complications occurred in 64 (12.8%) patients. In most of them (N = 35; 7%) the mesh was implanted supra-aponeurotic, and the complications, which manifested themselves in the form of serous-hematic collections in the vicinity of the prosthetic medical device and wound infections, are as follows:

- 29 subcutaneous hematomas (1.6%);
- 40 subcutaneous seromas (2.2%);
- 58 infections of the surgical wound (3.2%).

The therapeutic conduct was simple, consisting of surgical drainage of blood collections through the surgical wound, evacuation of serous collections by repeated punctures and direct drainage of septic collections.

Late morbidity was assessed after 30 days postoperatively, taking into account the period 01.07.2011-01.11.2021. The observation sheets of 192 patients who returned for the application of the therapeutic conduct were also analyzed at the Clinic I and Clinic II Surgery of the "St. Spiridon" Hospital. It should be noted that the number of cases of late complications may be higher because it cannot be ruled out that some patients may have turned to other surgical services for possible complications, patients who could not enter the monitoring of this study.

Patients who presented during the period 01.07.2011-01.12.2020 presented for the following complications:

65 (3.6%) patients presented with chronic local suppurations.

149 (8.2%) patients experienced recurrence of the incisional hernia.

14 (0.8) patients with intestinal obstruction formed by adhesive flanges.

Of the late complications, 75 were operated on and 32 parietal suppurations were cured by simply draining the septic collection, followed by secondary suturing of the dehiscent wound. In 3 patients with recurrent eventration, surgery was contraindicated due to multiple organic stains.

The following interventions were performed:

- 12 intestinal obstructions resolved by lysis of the adhesions. The prosthetic graft being integrated in the abdominal wall, the suture of the wound edges was made in the subtotal plane, disregarding the existence of the in the wall.
- 15 chronic suppurations with intolerance to the synthetic material benefited from the total ablation of the prosthetic medical device placed supra-aponeurotic.
- one chronic suppuration benefited from the partial excision of the mounted above the aponeurotic tissue and the installation of a new preperitoneal prosthetic medical device (a la Rives) which in turn was not tolerated and also partially excised,

the wall being partly sutured.

- patients who had recurrence of the eventration benefited from a new prosthetic medical device with the fit of the preperitoneal or intraperitoneal prosthetic medical device, as the case may be.

Analyzing late complications depending on the stratigraphic level of medical device implantation, it can be seen that most of them appeared after the implantation of the prosthetic medical device above the aponeurosis. Thus, out of a number of 192 events that presented for late complications, 107 patients (55.7%) had the prosthetic medical device implanted above the aponeurosis, and the remaining ones had the net implanted in the deep planes of the wall.

The duration of postoperative hospitalization was on average 9.2 days and was influenced by the associated morbidity. Of the 1820 cases analyzed in only 9 patients, the postoperative hospitalization period exceeded 30 days.

The representation of the data on the number of hospitalization days of the patients in the analyzed group shows that the number of those who resumed their activity after the first 10 days after surgery is significantly higher than those who required longer hospitalizations.

The condition at discharge is an indication of the postoperative evolution and from the data recorded in the 1820 patients it can be seen that the percentage of surgically cured (96.6%) is an argument in favor of the alloplastic cure of postoperative events.

DISCUSSION

Hernia is a common condition with an incidence of 2-15% (7). The World Society of Emergency Surgery (WSES) broadly categorizes abdominal wall hernias into groin hernias and ventral hernias based on anatomical location. Groin hernias are located at the bottom half of the body and includes these types of hernias: indirect inguinal, direct inguinal, and femoral hernias. Ventral hernias encompass the other types of hernias which include umbilical, epigastric, Spigelian, lumbar, and incisional hernias (8).

In our study the statistical analysis of the selected cases revealed that at a number of 5865 of abdominal wall defects surgeries that were performed in our clinics between 01.01.2006–01.07.2021 we recorded 3249 groin hernias, 3029 inguinal hernias (93%), 220 femoral hernias (7%). A similar study that analyzed a total of 46,717 persons operated for a groin hernia found that 97% of all groin hernia repairs were inguinal hernias and 3% femoral hernias (9). Inguinal hernia is the most frequently diagnosed hernia and during their lifetime one third of males are diagnosed with an inguinal hernia. The age distribution is bimodal with the highest incidence in childhood and after 50 years of age (10). Referring to the incisional hernia we found that is more frequent in females, with a ratio of 2: 1 in favor of women. In a study performed of a total of 368 incisional hernias that been operated in the First Surgery Clinic, University Emergency Hospital Bucharest, female sex was predominant (81.25%) (11).

The distribution by decades of age reveals a higher incidence of events within the 5th and 6th decades of life. The age distribution is bimodal with the highest incidence in childhood and after 50 years of age (10).

Organic strains were found in a percentage of 62% being represented by various organo-systemic and metabolic disor-

ders Among the organic dysfunctions mentioned, obesity was the most common with an index of 29%. The literature also cites that obesity is the main cause on abdominal wall defects (12-16).

The highest incidence is reported on the midline, the influence of the topography of the parietal defect is explained by the fact that the median laparotomy offers the best comfort in resolving surgical emergencies, being preferred by most surgeons. A systematic literature search performed concluded that he risks of developing an incisional hernia after primary elective median laparotomy is reported in the literature as being between 5 and 20% (17).

Patients requiring emergent surgery for hernia vary widely in presentation and management, and the variation in timing of urgent surgery impacts surgical outcomes. The small percentage cases with gangrene (9.6% cases with gangrene) reveals the prompt urgent surgical intervention. The literature cites that delay in surgery for emergent hernias increased the odds of major morbidity but not mortality, patients presenting with hernia and an indication for urgent surgical intervention may benefit from an operation as soon as feasible (18).

Referring to the treatment, the evaluation of the benefits and harms of repair techniques in adults, specifically comparing closure with mesh versus without mesh, most authors decided that mesh repairs probably reduce the rate of hernia recurrence, and reduce visceral or neurovascular injuries, making mesh repair a common repair approach. Mesh repairs may result in a reduced length of hospital stay and time to return to activities of daily living. Non-mesh repair is less likely to cause seroma formation and has been favored in low-income countries due to low cost and reduced availability of mesh materials (19-23).

Controversy exists regarding the outcomes following ventral hernia repair with polypropylene (PP) or polyester (PET) mesh. Some studies suggest that mesh material does not affect recurrence or infection in ventral hernia repair and that surgery can be safely performed with both PP and PET mesh (24-27), other authors polyester mesh placed during ventral hernia repair results in acceptable infection rates, and no direct bowel complications or fistulas (28).

Although there was a trend toward more recurrence with suture repair in our study, this was not statistically significant. Mesh repair was associated with seromas (2.2%) and infections of the surgical wound (3.2%) but is not statistically different from other studies (29).

Analyzing late complications depending on the stratigraphic level of prosthetic medical device implantation, it can be seen that most of them appeared after the implantation of the prosthetic medical device above the aponeurosis. Meshes implanted intraperitoneally are known to cause adhesions potentially resulting in complications such as chronic pain, enterocutaneous fistula, or mesh infection. A study was performed on rats, on a model mimicking a clinical situation like hernia repair by intraperitoneally implanted meshes when mesh has contact with normal and with de-peritonealized intestine. The high adhesion scores of rats with local de-peritonealization compared with the low scores of animals with intact peritoneum indicate that the integrity of intestinal peritoneum is a decisive factor for adhesion formation (30). There is no single treatment modality to prevent adhesion formation after abdominal wall defect repaired with prosthetic materials (31-33).

CONCLUSIONS

Abdominal hernia is a common problem in the general population. Abdominal hernias are more common in men than women, there is an obvious relationship between obesity, history of abdominal surgery, history of abdominal trauma, family history and hernias. Early diagnosis, easily accessible health facilities and health education are important to prevent complications and improve quality of life.

Based on the currently evidence in midline closure after elective laparotomy in the small bites technique can be recommended to significantly reduce the rate of incisional hernia. The additional use of a prophylactic mesh in high-risk patients can significantly reduce the occurrence of incisional hernia.

Mesh repair has a small reduction in recurrence rates compared with suture repairs for primary ventral hernias, but an increased risk of seroma and infection of the surgical site was observed.

CONFLICT OF INTEREST AND FUNDING

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