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A RETROSPECTIVE ANALYSIS OF THE CAUSES OF POSTOPERATIVE VENTRAL HERNIA RECURRENCE

V. I. Piatnochka, S. I. Kornaha, R. S. Kohan

Department of Surgery of Academic and Research Institute of Postgraduate Education
of I. Horbachevsky Ternopil National Medical University, Ternopil, Ukraine

Abstract

Considering the results of surgical treatment of postoperative ventral hernia, a significant number of recurrences of 4.3–46 % should be noted, and in case of large and giant postoperative ventral hernias reaches up to 80 %, which is associated with demographic imbalance that is an increase in the number of persons of old and senile age with comorbidity typical for them. Excessive obesity, especially in women, requires a revision of the main surgical approaches in the choice of methods of hernioplasty. Failure to take into account the present syndrome of undifferentiated connective tissue dysplasia (UCTD) in the performance of hernioplasty and allohernioplasty in 60 % of cases leads to postoperative relapse.

Objective. On the basis of the analysis of the performed surgical treatment of patients with ventral and postoperative ventral hernia, to study the main causes of the development of recurrent hernia, which would improve the results of surgical treatment of this category of patients.

Materials and methods. The clinical section of the work is based on a retrospective analysis of the results of surgical treatment of 1419 patients who underwent surgery on the anterior abdominal wall for primary ventral and postoperative ventral hernias. The distribution of patients into groups was according to the periods of surgical treatment of patients: from 2001 to 2009 and from 2010 to 2017. In the first period, 597 (42.07%) patients

who made the comparison group were examined and operated. The main group (2010–2017) amounted to 822 (57.93 %) patients.

To determine the localization, size and extent of hernial bulging in defects of the anterior abdominal wall, we used the classification of the European Association of Surgeons-Herniologists (EHS-classification, 2008).

In the comparison group, R1 was observed in 123 (93.18 %) patients, R2 – in 6 (4.55 %), R3 – in 2 (1.51%), R4 and more – in 1 (0.76 %). In the main group: R1 was observed in 63 (71.59 %) patients, R2 – in 18 (20.45 %), R3 – in 5 (5.68 %), R4 and more – in 2 (2.28 %).

Results. In 250 (17.62 %) patients, recurrent hernia developed after various types of surgery. The highest recurrence rate was observed in patients after own tissue hernioplasty, which was 36.07 % of all operated patients according to this procedure. In second place, by the frequency of relapse were patients after performed allohernioplasty using inlay technique – 19.63 %. The recurrence rate after allohernioplasty by the onlay technique is, according to our study, 10.58 %. After performing the sublay technique, the results obtained differ significantly with a low percentage of relapses compared to other methods of hernioplasty. Thus, the recurrence was only in 6.01 % of cases. The only method of surgical treatment of POVH with no recurrence was the method of hernioplasty with anatomic separation of the components of the anterior abdominal wall (CST), which was performed in two variants – without the use of polypropylene mesh (PPM) by Ramirez and combined one using PPM. Such data may be explained by the small number of completed surgery interventions (45 (3.17%)) and short observation periods (4 years).

Conclusions. Analyzing the causes of recurrence, it can be argued that the main ones are the choice of inadequate method of hernioplasty to a specific clinical situation, incomplete revision of the musculo-aponeurotic layer of the anterior wall, especially in patients with postoperative ventral hernias and concomitant undifferentiated connective tissue dysplasia and obesity, the presence of hidden (small in size and clinically intact) defects and weaknesses, incorrect choice of mesh implant type (“light” or “heavy” polypropylene mesh) and its size, choice of inappropriate material thickness.

Key words: ventral hernia; postoperative ventral hernia; polypropylene mesh; relapse, complication.

Introduction. To date, considerable progress has been made in primary ventricular (PAH) and postoperative ventral hernias (POVH), but the problem of recurrence and “recurrence after recurrence” remains relevant. Hernia relapse is observed in almost every

tenth operated patient, and recurrence rate correlates with the size and localization of hernia. Midline laparotomy, which prevails when performing emergency surgery, determines the high risk of developing mid-localized POVH [1, 2].

The introduction into surgical practice of the use of mesh alloplastic materials significantly influenced the results of surgical treatment of patients with PVH and POVH [3, 4, 5]. Improper technique for performing allohernioplasty, choosing an inadequate method of surgery and type of mesh prosthesis without taking into account comorbid pathology in patients often leads to recurrence [6]. Such a fact as “relapse after relapse” reflects to a small extent in domestic and foreign literature. There is insufficient analysis of the causes of its occurrence, which, in turn, leads again to an unjustified choice of surgery for recurrence. A significant number of early and late complications in the postoperative period in patients with a high comorbidity index also contribute to the high incidence of recurrence [7, 8].

UCTD syndrome is another condition that has been increasingly featured in the past 15–20 years as a pathogenetic predictor of the development of both primary and POVH. This is especially true when performing surgery in patients with recurrence, because in the vast majority of cases surgeons do not take into account and do not consider the presence of this syndrome. Surgical interventions in specialized centers of surgical treatment of hernias by highly qualified specialists with precision technique of performing surgery with minimal and mainly without complications often leads to relapse, because this syndrome is not taken into account.

In addition, there is no analysis of tissue responses in the implantation region for different types of PPV, especially those that differ in the specific weight of the prolene content. “Heavy” PPM, as a larger “stimulus”, provokes a prolonged phase of aseptic inflammation with pronounced exudation, which in patients with diabetes and low immunoresistance leads to the development of complications and, as a consequence, recurrence [9, 10].

The lack of a unified approach to the strategy of treatment of patients with PVH and POVH of the old and senile age causes high rates of not only relapses, but also general complications and even mortality. This is especially true for people with high index of comorbidity [11, 12].

Objective. On the basis of the analysis of the performed surgical treatment of patients with ventral and postoperative ventral hernia, to study the main causes of the development of recurrent hernia, which would improve the results of surgical treatment of this category of patients.

Materials and methods. The clinical section of the work is based on a retrospective analysis of the results of surgical treatment of 1419 patients who underwent surgical interventions on the anterior abdominal wall for primary ventral (PVH) and postoperative ventral hernias (POVH). The distribution of patients into groups was according to the periods of surgical treatment of patients: from 2001 to 2009 and from 2010 to 2017. In the first period, 597 (42.07%) persons who made the comparison group were examined and operated. The main group (2010–2017). amounted to 822 (57.93 %).

To determine the localization, size and extent of hernial bulging in defects of the anterior abdominal wall, we used the classification of the European Association of Surgeons-Herniologists (EHS-classification, 2008).

In both study groups, there was a predominance of mid-localization PVH (97.55 % in the comparison group and 90.99 % in the main group). M1 defects in the comparison group and the main group were detected in 7 (2.45 %) and 15 (4.36%) patients, respectively; M1-3 – in 186 (65.03 %) and 225 (65.41 %), respectively; M3 – in 86 (30.07 %) and 73 (21.22 %) persons, respectively. There were no M4-5 defects in the primary hernia in both groups. L4 defects were observed in 7 (2.45 %) and 31 (9.01%) both operated groups. No other localization defects (L1-L3) were noted. In both groups, 50.64 % of people with PVH were diagnosed with W2 size predominance, mainly due to hernia of the white lines of abdomen and diastasis of the rectus muscles.

In the comparison group, R1 was observed in 123 (93.18 %) patients, R2 – in 6 (4.55 %), R3 – in 2 (1.51%), R4 and more – in 1 (0.76 %). In the main group: R1 was observed in 63 (71.59 %) patients, R2 – in 18 (20.45 %), R3 – in 5 (5.68 %), R4 and more – in 2 (2.28 %).

Results. According to our study, recurrent hernia developed after various types of surgery in 250 (17.62 %) patients. The distribution of recurrence by types of surgeries performed in the different study periods is shown in Table 1.

Table 1

Types of performed hernioplasty	Total number of surgeries	Recurrence rate
Own tissue hernioplasty	438	158 (36.07 %)
Onlay	463	49 (10.58 %)
Inlay	107	21 (19.63 %)
Sublay	366	22 (6.01 %)
CST	45	-
Total	1419	250 (17.62 %)

As can be seen from Table 1, the highest recurrence rate was observed in patients after own tissue hernioplasty, which was 36.07 % of all operated patients according to this method. In domestic and foreign literary sources, patient's own tissue hernioplasty is practically no longer discussed, since, according to long-term randomized studies, it has the highest recurrence rate. Today, own tissue hernioplasty occurs only in cases of small (up to 5 cm in diameter) hernias, in young people and without UCTD syndrome.

Patients after performed allohernioplasty by inlay method were in the second place by the frequency of relapse – 19.63 %. This technique involves the closure of a hernia defect without the “toe-to-toe” tension. However, the chosen technique of hernioplasty, in our opinion, has limited indications for use due to the high rate of recurrence and complications. Most often, this technique is acceptable only in the group of patients with a high index of comorbidity and a high likelihood of the occurrence of abdominal compartment syndrome in the early postoperative period. The advantages of this method are the lack of tissue tension, the technical simplicity of execution and the short duration of surgery.

The recurrence rate after allohernioplasty by the onlay method is 10.58 %, according to our study. Despite the simplicity of the technical implementation of this surgery after it revealed the highest number of local complications among all patients: seroma – 6.76 %, hematoma – 2.68 %, infiltrates – 2.75 %, lymphorea – 3.31 %, marginal necrosis – 1.20 %, suppuration – 0.85 %. Therefore, we consider it advisable to recommend this technique for use only in cases of severe concomitant pathology, which implies a high risk of general postoperative complications and after 3–4 relapses, when the anatomic architectonics of the anterior abdominal wall is lost, which makes it impossible to carry out more reliable in this clinical situation techniques of hernioplasty.

After performing the sublay technique, the results obtained differ significantly with a low percentage of relapses compared to other methods of hernioplasty. Thus, the recurrence was only in 6.01 % of cases. In addition, one of the main predictors of recurrence of hernias is postoperative complications, which are minimal when performing this technique. With this technique, we practically did not note the prolonged lymphorea, seromas formation, and local complications such as hematoma, infiltrate and suppuration were the least common among all methods of allohernioplasty. Even better results were observed when performing this technique of surgery with the use of “light” PPM.

The only method of surgical treatment of POVH with no recurrence was the method of hernioplasty with anatomic separation of the components of the anterior abdominal wall (CST), which was performed in two variants – without the use of polypropylene mesh (PPM)

by Ramirez and combined using of PPM. Such data may be explained by the small number of completed surgical interventions (45 (3.17 %)) and short observation periods (4 years).

The distribution of recurrence in observation groups is shown in Table 2.

The reasons for the decrease in the number of relapses between two groups when performing own tissue hernioplasty are, first, the reduction twice the number of their performance, the use of modern atraumatic monofilament suture materials, improving the quality and technique of performing surgeries and performing them only if medically required (when small – up to 5 cm hernial orifice and especially in young people without manifestations of UCTD syndrome), which minimize the number of local complications (suppurations, ligature fistulas), which is a prerequisite for recurrence.

Table 2

Types of performed hernioplasty	Comparison group		Main group	
	Total number of surgeries (n=597)	Number of recurrences (n=162)	Total number of surgeries (n=822)	Number of recurrences (n=88)
Own tissue hernioplasty	314	125 (39.81 %)	124	33 (26.61 %)
Onlay	254	18 (7.09 %)	209	31 (14.83 %)
Inlay	17	12 (70.59 %)	90	9 (10.0 %)
Sublay	12	7 (58.33 %)	354	15 (4.24 %)
CST	-	-	45	-

Estimating the number of relapses after the onlay technique, we can state that they are relatively identical in two groups. This is mainly due to the largest number of local complications arising from the application of this technique, which are known to be the main causes of relapse. In addition, hypotrophy of the muscles of the aponeurosis of the anterior abdominal wall, loss of their tone cause the scar tissue to weaken and create weaknesses under the mesh implant. An important factor in maintaining the number of relapses at this level is also that in this technique, abdominal compartment syndrome (ACS) occurs more often due to the tension of the tissues and due to the method of allohernioplasty inadequately chosen in one or another clinical situation. Unlike the sublay technique, this method often involves the removal of the main hernia defect by a surgeon without a sufficient evaluation of the entire old postoperative scar, where small hernia defects can occur, without clinical manifestation, which in the short term after surgery will cause recurrence.

Discussion

For the whole period of the study, 107 (7.54 %) patients were operated by the inlay technique, and 12 relapses (70.59 %) in the comparison group and 9 (10.0%) in the main

group were detected after it. The main disadvantage of this technique is the insufficient overlap of the mesh implant edges of the defect. In addition, conditions are created for the possible migration of PPM, scarring of the defect edges and further development of recurrence.

Assessing the sublay technique, it can be stated that a significant percentage of relapse (7 (58.33 %)) was observed between 2001 and 2009, which is related to the implementation of this technique in practice and, as a consequence, technical imperfections in its implementation. In the period from 2010 out of 354 surgical interventions of this type recurrence occurred only in 15 (4.24 %) patients. However, the disadvantage of this method can be considered to be its limited use in the removal of PVH and POVH of large and giant size. In such cases, this surgery can lead to significant tension of the anterior abdominal wall, reducing the volume of the abdominal cavity, which in patients with a high index of comorbidity leads to the development of many complications.

The CST technique, which was used only in patients of the main group, in combination with and without PPM, did not lead to recurrence in any case. The surgery of separation of anatomical components by A. Ramirez involves an increase in the volume of the abdominal cavity at the closure of giant POVH by releasing the aponeurotic part of the external oblique muscle, which makes it possible to trace the musculo-aponeurotic structures to the midline of the abdomen up to 10 cm. However, like any other autoplasmic surgery, in its classic operation, it is accompanied by a large number of relapses. Therefore, the use of modifications of O. Ramirez surgery, involving the separation of anatomical components in combination with alloplasty of the abdominal wall, is quite effective, contributing to the reduction of postoperative complications and relapses.

In our opinion, research of the causes of recurrence of hernia after relapse is interesting. Thus, in patients operated on with the first recurrence of hernia after performed by us surgery, the first recurrence occurred in 96 (38.40 %) patients; relapse after the second relapse – in 32 (12.80 %) patients; relapse after the third relapse – in 7 (2.80 %) patients; relapse after the fourth relapse – in 4 (1.60 %) patients.

Conclusions

Analyzing the causes of recurrence, we can state that the main ones are the choice of inadequate method of hernioplasty to a specific clinical situation, defective revision of the musculo-aponeurotic layer of the anterior wall, especially in patients with POVH and concomitant UCTD and obesity, on the presence of hidden (small in size and clinically intact)

defects and weaknesses, incorrect selection of the type of mesh implant (“light” or “heavy” PPM) and its size, the choice of the wrong type of suture material and its thickness.

In addition, complications that often undiagnosed in time and caused by the trauma of surgery are important in the development of relapse.

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