World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

CORRECTING CONCOMITANT ABDOMINAL PATHOLOGY WITH VENTRAL HERNIAS

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Article history:

Received: June 24th 2022
Accepted: July 24th 2022
Published: August 30th 2022

Abstract:

The treatment results of 331 patients with ventral hernia and concomitant abdominal cavity pathology have been included in the study. Simultaneous abdominal cavity pathology requiring surgical correction in ventral hernias was 52,8%, biliary stone disease (30,1%), pelvic organs pathology in women (30,8%), adhesions of the abdomen and chronic intestinal obstruction (46,7%), and also stage III-IV obesity and abdominoptosis (29,7%) were revealed more frequently. At the location of concomitant abdominal pathology at a distance from the hernial defect (M1S8 or M3S2) the laparoscopic simultaneous stage is preferred, which was successfully carried out in 37,5% of patients, over 1/3 of patients in the main group. Optimization of tactical and technical aspects of the simultaneous surgical correction of ventral hernias and concomitant abdominal pathology with the priority use of endovideosurgical techniques and non-tension alloplasty methods permitted to decrease the incidence of postoperative complications from 8,6% to 5,3%, to reduce the duration of surgery from 72,5 ±3,4 min to 58,5 ±4,1 min and to reduce hospitalization time from 10,2±0,4 to 8,3±0,6 bed days.

Keywords: abdominal hernia, simultaneous operations

INTRODUCTION. According to World Health Organization "hernias of anterior abdominal wall in combination with simultaneous abdominal cavity diseases is one of the most common surgical diseases and occurs in 3-7% of the population, mainly affecting able-bodied people". According to the literature, 15-20% of patients who have undergone herniotomy undergo repeated surgical interventions for other surgical diseases in the years following surgery (Belokonev V.I. et al., 2018; Doble J.A. et al., 2019). This determines the relevance of the problem of simultaneous operations. Attention should be paid to the irrationality of performing only herniotomy for a ventral hernia (VH) if the patient has concomitant abdominal organ disease. If only herniotomy is performed, reoperation for abdominal pathology often negates the results of hernioplasty.

Simultaneous operations on the abdominal wall and abdominal organs increase the complexity of the intervention, but it reduces treatment time, reduces the risk of possible complications after herniotomy in the form of associated diseases due to additional anesthesia and emotional distress associated with the need for repeated intervention (Ahonen-Siirtola M. et al., 2017; Nasirov M.Y. et al., 2015). In patients with hernias the most frequent findings are cholelithiasis, in women - pelvic organ pathology, in the abdominal cavity - adhesions, chronic and subacute intestinal obstruction, abdominoprotosis, etc.. Approaches to performing simultaneous interventions in patients with hernias have their own peculiarities, since the location of the organs with pathology may not coincide with the localization of the hernia. Special problems can be caused by the presence of adhesions, adhesive intestinal obstruction and fistulas located at different levels of the gastrointestinal tract (Khakimov M.Sh. et al., 2020; Gillion J.F. et al., 2018). All this requires a detailed elaboration of the surgical technique at the herniotomy stage, at the intra-abdominal stage and at the stage of closure of the abdominal cavity.

OBJECTIVE: to improve the results of surgical treatment of patients with ventral hernias and concomitant abdominal pathology by optimizing the tactical and technical aspects of simultaneous simultaneous operations with the priority use of

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Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

endovideosurgical techniques and non-tension plasty methods.

MATERIAL AND METHODS: The treatment results of 331 patients with ventral hernia and concomitant abdominal cavity pathologies admitted to the surgical departments of Samarkand state medical university clinics during the period from 2012 till 2021 were presented. The patients were conventionally divided into two groups: 104 (31.4%) patients with anterior abdominal wall hernia and simultaneous abdominal organ pathology operated between 2012-2016 constituted the comparison group. The main group consisted of 227 (68,6%) patients operated on in 2017-2021 in whom we used endovideosurgical techniques and non-tension methods of plasty in surgical correction of ventral hernia and concomitant surgical pathology of the abdominal cavity.

Among those examined 225 (67.9%) patients had a history of various abdominal surgeries, and 106 (42.1%) patients presented with newly diagnosed hernia. According to Chervel J.P. and Rath A.M. (1999) 212 (64.1%) patients had large (W3) and giant (W4) hernias. The vast majority of patients 265 (80.1%) had midline hernias. Out of 331 patients, 132 (39.9%) had recurrent hernias (Rn).

All patients had ventral hernia as their main surgical condition. It should be noted that out of 429 patients with ventral hernias operated on between 2017 and 2021, 227 had hernialloplasty supplemented by surgical correction of concomitant abdominal pathology. According to our data, the incidence of simultaneous pathology in ventral hernias was 52.8%. Simultaneous pathology was diagnosed preoperatively in 74.6%, intraoperatively in 25.4%.

A total of 178 concomitant surgical pathologies were identified in the comparison group, 334 in the main group; some of them had two or more. Abdominal adhesions prevailed in 67 (37.6%) and 106 (46.7%), adiposity III and IV stages. with a sagging abdomen in 32 (17.9%) and 67 (29.5%) patients, cholelithiasis in 29 (16.3%) and 69 (30.1%) patients, liver and pancreatic cysts in 8 (4.5%) and 13 (5.7%) patients, in 11 (6.2%) and 19 (8, 4 % of patients had anterior abdominal wall surgical pathology (ligature fistulas and pseudocysts of the anterior abdominal wall), pelvic organ pathology in women 33 (18,6%) and 70 (30,8%) in the comparison and main groups of patients, respectively. (Table 1).

It should be noted that the incidence of concomitant surgical pathology of the anterior abdominal wall and abdominal organs increased proportionally in patients with increasing hernia size - at W3 59.6%, W4-66.3%.

Among all examined patients 208 (62,8%) had various concomitant somatic diseases of vital organs. Of these, 139 (41.9%) patients had two or more comorbid somatic diseases. According to ASA class II, 178 (53.7%) patients were classified as class II, and 30 (9%) patients were classified as class III.

Table 1
Structure of concomitant surgical diseases of the abdominal cavity in patients of the main group

Simultaneous pathology	Comparison group		Main group		Total	
	abs.	. %	abs.	. %	abs.	. %
GI	29	16,3	69	30,1	98	18,8
Liver cysts	6	3,4	11	4,8	17	3,2
Pancreatic cysts	2	1,1	2	0,9	4	0,7
Adhesions. Chronic subacute intestinal obstruction	67	37,6	106	46,7	173	33,1
Ovarian cysts	9	5,1	23	10,1	32	6,1
Uterine myoma	22	12,4	47	20,7	69	13,2
Ligature fistulas and pseudocysts of the anterior abdominal wall	11	6,2	19	8,4	30	5,7
Obesity stage III - IV sagging abdomen	32	17,9	67	29,5	99	18,9

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Volume-13, August 2022
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Total	178	100	344	100	522	100

Computed tomography and computed tomographic hernioabdominometry (CTGA) were performed to determine the size of the hernia gate, the volume of the hernia sac contents, the detection of additional aponeurosis defects, the detection of concomitant abdominal organ pathology, the thickness and evenness of the subcutaneous fat of the anterior abdominal wall, and to determine the preliminary hernioallo- and abdominoplasty method. This method was performed in 58 (25.9%) patients in the main group (Fig. 1).

Figure 1. Anterior abdominal wall view and computed tomography hernioabdominometry of patient C., 62 years old with postoperative ventral hernia (M2W3R0) and adhesions with chronic intestinal obstruction

The method also made it possible to verify the presence of simultaneous abdominal pathology. CTGA allowed the identification of anterior abdominal wall topography defects and the selection of the optimal method of plasty. When the relative volume of the herniotomy was less than 5% of the abdominal volume, the hernias were considered small. If the relative volume of the herniotomy ranged from 5.1% to 14.0% of the abdominal cavity volume, they were considered to be the average hernias and the tension type of hernioalloplasty was preferred - the endoprosthesis "on lay" implantation with the defect suturing.

When the relative volume of the hernial bulge ranged from 14.1% to 18%, the hernia was considered to be large, with non-tension prosthetic plasty, "correction" or "reconstruction" of the anterior abdominal wall being the method of choice. The final choice of surgical technique was made intraoperatively, with the "reduction test" being the decisive factor. At 18% and more of the relative volume of the hernial protrusion and the volume of the abdominal cavity, the hernia was considered gigantic and the choice of surgery was made only in favour of non-tension plasty - endoprosthesis "onlay" implantation without suturing the defect, endoprosthesis "onlay + sublay" without suturing the defect and implantation by the combined method "onlay + sublay" without suturing the defect with mobilization of the straight abdominal muscles' vaginas by Ramirez.

RESULTS AND DISCUSSION.

Patients in the comparison group (n=104) underwent hernialloplasty in 62 (59.6%) patients with tension fusion and in 42 (40.4%) with non-tension fusion; i.e. tension fusion was preferably performed.

In the main group (n=181), the choice of hernialloplasty was differentiated and based on the criteria developed by us, according to which the patients were divided into 4 subgroups (Table 2).

Patients in the 1st subgroup with a volume of hernioplasty up to 14% of the abdominal cavity volume according to CTGA data underwent endoprosthesis "onlay" implantation with suturing of the defect. This group consisted of 78 (43.1%) patients.

In the 2nd subgroup (n=38) according to CTGA data, with the volume of herniotomy more than 14.1% of the abdominal cavity volume, we carried out tension-free plasty. To increase the volume of the abdominal cavity, to prevent the development of compartment syndrome, after the abdominal cavity isolation by the hernia sac flap, plasty of the anterior abdominal wall was carried out by applying a mesh over the aponeurosis without suturing. Endoprosthesis fixation was performed with U-shaped sutures. These sutures were preformed with all layers of the muscular-

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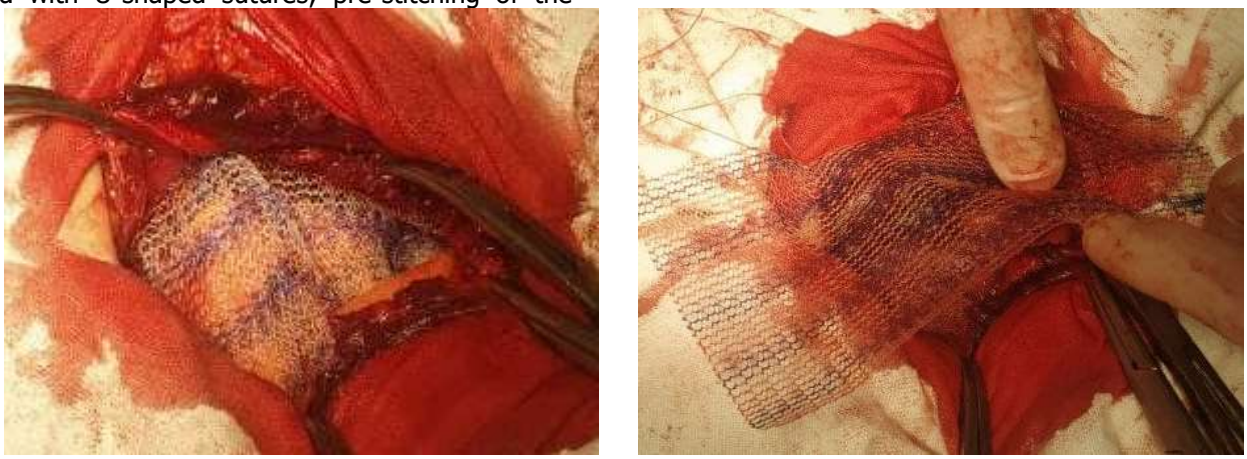
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

aponeurotic wall up to the peritoneum prior to closure of the abdominal cavity with a hernia sac flap.

Table 2
Types of hernioplasty in the main group

Subgroups	Type of operation	Numb	%
Stretch plasticisation methods			
1st subgroup	Onlay implantation with suturing of the defect	78	43,1
Non-tensioned methods			
2nd subgroup	Onlay implantation without suturing the defect	38	20,9
3rd subgroup	Combined onlay + sublay implantation without suturing	32	17,7
4th subgroup	Combined onlay + sublay implantation without suturing with Ramirez mobilisation of the rectus abdominis vaginalis	33	18,3
	Total	181	100

In 32 (17,7%) patients in the 3rd subgroup with the size of the hernial defect of over 10 cm and the volume of the hernial bulge of over 18% of the abdominal cavity volume, according to CTGA data, a combined untensioned hernioplasty "onlay + sublay" was performed, that is, one implant was placed behind the muscular-aponeurotic layer after the abdominal cavity borderline with the hernial sac flap, the second implant was placed over the aponeurosis. After the perimeter of the abdominal cavity was separated by peritoneum, the implant was cut out, its size along the perimeter being 3 cm larger than the size of the hernia defect; then the edges of the mesh implant were pre-stitched with U-shaped sutures; pre-stitching of the implant considerably simplified the technique of its fixation. Further, the endoprosthesis was placed according to the "sublay" type; the previously placed U-shaped sutures were passed through all the layers above the aponeurosis and the second endoprosthesis was fixed to these sutures, placed "onlay"; knotty sutures were also placed between the endoprostheses, creating an artificial "white line" of the abdomen. The anatomical and physiological reconstruction of the anterior abdominal wall as well as the white line of the abdomen is of particular importance in this method. The use of this method in the clinic has yielded good functional results (Fig. 2).



1 2

Fig. 2. Stages of "sublay" (1) and "onlay" fixation (2) with pre-applied U-shaped sutures

In subgroup 4, in 13 patients with a high risk of tissue tension and increased intra-abdominal pressure, we used tension-free alloplasty with mobilization of the vaginas of rectus abdominis according to Ramirez (1990).

Thus, in the main group of patients, where hernialloplasty was performed from the herniolaparotomy access, we performed a non-tensioned alloplasty in 56.9% of cases.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
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Laparoscopic prosthetic hernioplasty at ventral hernias was performed in 46 patients of the main group (20,3%) in case of small and medium hernias with the corresponding sizes of aponeurosis defects - up to 5 and from 5 to 10 cm using polypropylene implants according to "ipom" method (Laparoscopic Intra Peritoneal Onlay Mesh). The trocar insertion sites were standardised and chosen where it was more convenient and safe after the simultaneous abdominal organ surgery.

34 (73.3%) of 46 patients underwent laparoscopic prosthetic hernioplasty using standard polypropylene mesh implants; in 12 (26.7%) composite Physiomesh or Prosid (Ethicon) mesh implants were used. When using standard implants in the abdominal cavity, the peritoneum was opened, the hernia sac was exposed and a "pocket" was created in the preperitoneal space, 5-6 cm from the hernia gate along the perimeter. Further, a mesh implant coiled into a tube was inserted into the abdominal cavity through the trocar, unfolded and placed in the created preperitoneal "pocket". It was clamped to the anterior abdominal wall using ligatures tied around the edges of the implant.

Suturing the implant to the anterior abdominal wall was performed using our modified Endo Close needle (Fig. 3). The use of the modified Endo Close needle was more convenient for the surgeon and safer for the patient than stitching the peritoneum intracorporeally.

Fig. 3. Uncoiling of the coiled implant (1), removal of the suture thread with a modified Endo Close needle (2), removal of the suture threads from the abdominal wall (3)

The use of composite mesh implants Physiomesh or Prosid (Ethicon) in 12 (26.7%) patients avoided the need for a preperitoneal "pocket" before fixation of the prosthesis to the anterior abdominal wall.

It should be noted that all 48 patients underwent laparoscopic hernialloplasty by the "non-tension" method, and eventually, in the main group of investigation, non-tension hernialloplasty was performed in 149 (65.6%) patients, i.e. in 2/3 of clinical cases.

Since all patients had ventral hernia as the main pathology, and abdominal organ syndrome as a simultaneous pathology, we chose the surgical access by taking into account, first of all, the position of the hernia gate, and then the position of the organ with the simultaneous pathology in the abdominal cavity.

We developed a schematic dystopia, i.e., the localization of the hernial defect on the abdominal wall and the location of the simultaneous pathology in the abdominal cavity. The localisation of the hernial bulge was assessed according to the classification of Chervel J.P. and Rath A.M. (1999), and the location of the simultaneous pathology was oriented on the topographic division of the abdominal cavity into 9 regions. When performing simultaneous surgeries in the comparison group, only the traditional wide access was used, i.e., the herniolaparotomy was extended to the epigastric or hypogastric region, which allowed the surgeon to perform the simultaneous stage of the operation. At the same time, the liquidation of the herniotomy defect was time-consuming, and the duration of the operation increased significantly. Besides, it had a number of serious drawbacks: high traumatic character of the operation, increased risk of postoperative wound and general complications, unsatisfactory cosmetic results, long period of early rehabilitation, etc. And when surgical diseases were located at a wide distance from each other, each pathology was operated on through separate accesses. As a whole, in the comparison group of patients 83 (79,8%) - simultaneous operation was carried out through the united herniolaparotomy access, 21 (20,2%) patients underwent simultaneous operation through the separate accesses. In the main study group, 46 (20.3%) patients with ventral hernias and simultaneous abdominal pathology underwent both stages of surgery from laparoscopic approaches using EVX. In these patients, LCE was performed in 19 cases, 11 patients underwent supravaginal amputation

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

or hysterectomy for myoma, 7 patients underwent ovarian cystectomy, 2 patients had fenestration of cysts from the liver and 27 patients had adhesiolysis for abdominal commissural disease and chronic intestinal obstruction. Stage 2 surgery was completed with laparoscopic hernioplasty.

In 39 (17,6%) patients of the main group 1-stage simultaneous pathology was corrected laparoscopically; the main stage of the operation - hernioplasty was carried out from the herniolaparotomy access. Moreover, LCE was performed in 23 patients, supravaginal uterine amputation for uterine myoma in 1, ovarian cystectomy in 4, liver cyst in 1 case, and adhesiolysis in 14 patients.

Thus, laparoscopic correction of both primary and simultaneous pathology was performed in 46 (20.3%) of 227 patients in the main group whereas endovideosurgical correction of simultaneous pathology was performed in 39 (17.6%).

At the same time, in 142 (62.6%) patients of the main group both stages of the operation were carried out using herniolaparotomy access. The reason was the close proximity of abdominal cavity pathology to the herniotomy defect. Dermatolipidectomy was performed after anterior abdominal wall plasty in 67 (29,5%) patients in the main group which had concomitant pathology in the form of II-III degree obesity. In the main group with the concomitant pathology located at a wide distance from the herniated defect, simultaneous stages of surgery were performed with the use of laparoscopic technique in 85 (37,5%) patients, that is, more than 1/3 of patients in the main group.

The following parameters were used as the main criteria to estimate the efficiency of the patients' treatment results in the compared groups: - abdominal complications of the early postoperative period; - extra-abdominal complications of the early postoperative period; - wound complications in the early postoperative period. Compartment syndrome was observed in 2 (1.9%) of the comparison group (Figure 4). There was an equal number of complications in both groups of patients (Criterion $\chi 2=4,043$; Df=1; p=0,045).

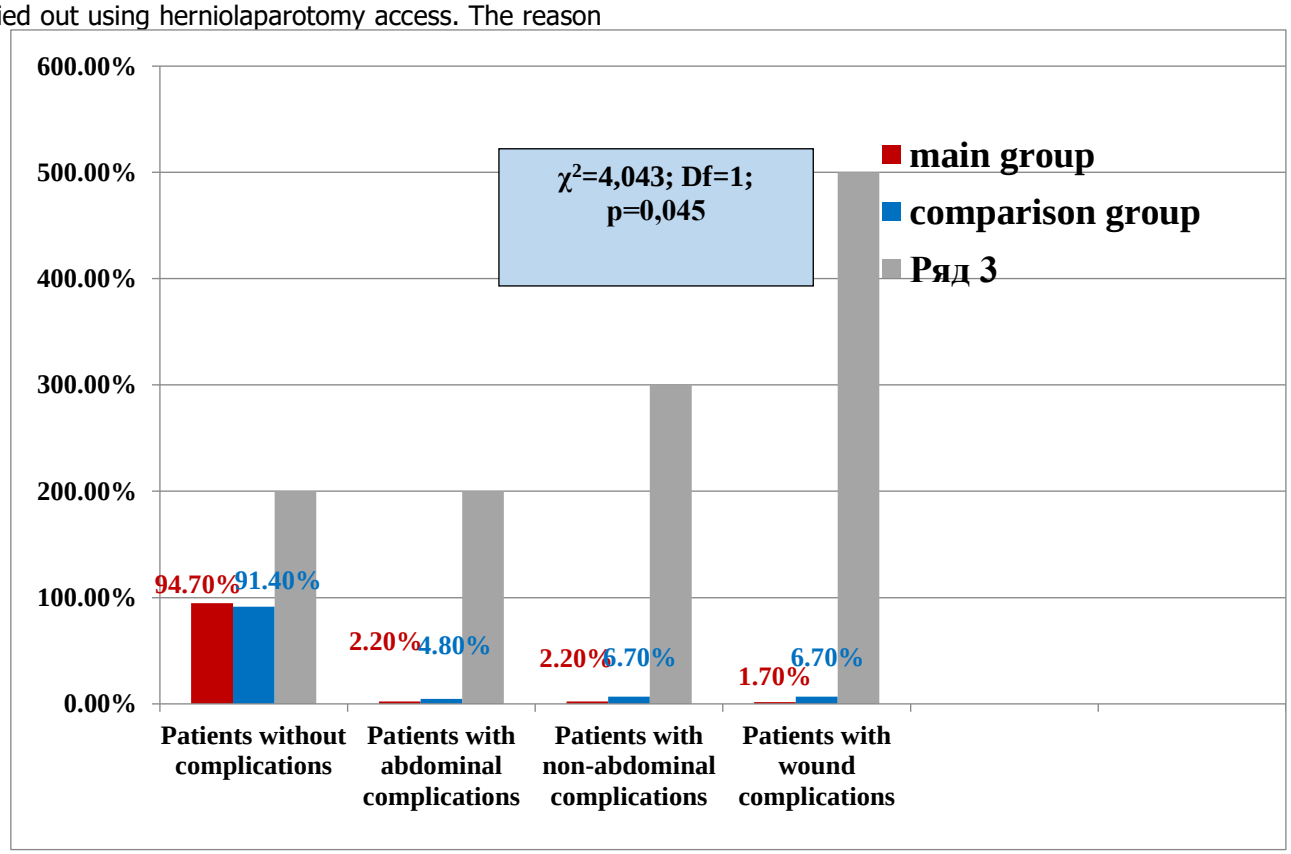

Figure 4. Distribution of patients according to the frequency of complications after surgery

When considering the time periods, it was noted that improvements in tactical and technical aspects ensured that all major perioperative periods were shortened).

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Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
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Long-term results were analyzed in 260 (78,5%) patients out of 331 operated on patients. Recurrence of ventral hernia was registered in 6 (1,8%), while in the control group this figure was 2,9% (3 patients), and in the main group - 1,1% (3 patients). In the control group in the distant postoperative period one (0,9%) complication after the simultaneous stage of the operation - external biliary fistula after echinococectomy from the liver - was observed.

Thus, according to the results of the study, the complications in the immediate postoperative period in the compared groups were as follows: - abdominal complications in 4.8% and 2.2%; -extra-abdominal complications (bronchopulmonary and cardiovascular) in 6.7% and 2.2%; -development of compartment syndrome in 1.9% (only in comparison group); -wound complications in 6.7% and 1.7%; -lethality 0.9% (only in comparison group) in main and comparison group respectively. While looking at the time characteristics, we note that the duration of in-hospital treatment was 8,3±0,6 days in the main group (10,2±0,4 days in the comparison group), mean duration of operation in the main group of patients was 58,5±4,1 minutes (72,5±3,4 days in the comparison group). Analysis of the patients' quality of life showed that optimization of tactical and technical aspects of the simultaneous surgical correction of the ventral hernia and combined abdominal pathology with the priority use of endovideosurgical techniques and non-tension alloplasty methods permitted to increase the rate of positive treatment results up to 98,7%.

CONCLUSIONS:

1. According to our study, the simultaneous abdominal pathology requiring surgical correction in ventral hernias was 52,8%, the most frequently revealed were cholelithiasis (30,1%), pelvic pathology in women (30,8%), adhesions of the abdomen and chronic intestinal obstruction (46,7%), and also stage III-IV obesity and abdominoptosis (29,7%). With increasing hernia size the number of patients requiring simultaneous interventions increased: at W3 - 59,6% and at W4 - 66,3%.

2. At the location of concomitant abdominal pathology at a distance from the hernial defect (M1S8 or M3S2) a laparoscopic simultaneous stage was preferred, which was successfully performed in 37,5% of patients, over 1/3 of patients in the main group.

Endovideosurgical hernialloplasty is methodologically grounded and effective in surgical treatment of small (W1) and medium (W2) size ventral hernias which was applied in 20,3% of cases in the main group of patients. Improvement of aspects of laparoscopic hernialloplasty with application of composite mesh implants as well as application of modified Endo Close needle with extracorporeal knotty tying at the stage of prosthesis fixation considerably simplifies the surgery technique.

4. CT-guided hernioabdominometry permits to identify defects of the anterior abdominal wall topography and choose the optimal method of plasty. According to CTGA data, at the volume of herniotomy up to 14% of the abdominal cavity volume, endoprosthesis "onlay" implantation with suturing of the herniotomy defect is possible; at more than 14,1% non-tension plasty is recommended.

5. Improvement of technical aspects of tension-free methods of hernialloplasty with endoprosthesis implantation by the combined method "onlay+sublay" in case of W3, W4 hernias permitted to avoid compartment syndrome development and to level hernioplasty recurrence.

6. Optimization of tactical and technical aspects of the simultaneous surgical correction of ventral hernias and concomitant abdominal pathology with the priority use of endovideosurgical techniques and non-tension alloplasty methods permitted to decrease the incidence of postoperative complications from 8,6% to 5,3%, to reduce duration of surgery from 72,5 ±3,4 min to 58,5 ±4,1 min and to reduce terms of hospital treatment from 10,2±0,4 to 8,3±0,6 bed days. At the same time, cure of several surgical diseases in one anaesthetic aid and surgical intervention justifies the necessity of simultaneous operations.

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