



Surgery for Abdominal Hernias and Combined Abdominal Pathology

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Abstract: The results of treatment of 331 patients with ventral hernia and concomitant abdominal organ pathology were 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%), abdominal adhesions and chronic intestinal obstruction (46,7%), and also stage III - IV obesity and abdominoprotosis (29,7%) were revealed more frequently. At the location of concomitant abdominal pathology far away from the hernial defect (M1S8 or M3S2), the laparoscopic laparoscopic approach was preferred as a simultaneous procedure, which was successfully carried out in 37,5% of patients, i.e. in more than 1/3 of the main group patients. Optimization of tactical and technical aspects of the simultaneous surgical correction of ventral hernia 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 minutes to 58,5 ±4,1 minutes and to reduce hospitalization time from 10,2±0,4 to 8,3±0,6 bed days.

Key words: abdominal hernias, simultaneous operations.

Introduction. According to the data of World Health Organization "hernias of anterior abdominal wall in combination with simultaneous abdominal cavity organs diseases is one of the most common surgical diseases and occurs in 3-7% of the population mostly 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 the operation. This determines the relevance of the problem of simultaneous operations. One should pay attention to the irrationality of performing only herniotomy for ventral hernia (VH) if the patient has concomitant abdominal disease. If only herniotomy is performed, repeated surgery for abdominal pathology often negates the results of hernioplasty.

Simultaneous operations on the abdominal wall and abdominal cavity organs increase the complexity of the intervention, but it reduces the treatment period, 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 biliary stone disease, in women - pelvic organ pathology, in the abdominal cavity - adhesions, chronic and subacute intestinal obstruction, abdominoprotosis, etc. are the most common. 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 detailed elaboration of the surgical technique at the stage of herniotomy, at the intra-abdominal stage and at the stage of abdominal closure.

Objective of the study: 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 endovideosurgical technologies and non-tensioned methods of plasty.

Material and Methods: The results of treatment of 331 patients with ventral hernia and concomitant pathology of abdominal cavity organs admitted to surgical departments of Samarkand State Medical University clinics during the period from 2012 to 2022 were included in the study. The patients were conventionally divided into two groups: 104 (31.4%) patients with anterior abdominal wall hernia and simultaneous abdominal cavity organ pathology operated between 2012 and 2016 constituted the comparison group. The main group consisted of 227 (68.6%) patients operated on in the period 2017-2022, to whom endovideosurgical techniques and non-tension methods of plasty were used in surgical correction of ventral hernia and concomitant surgical pathology of abdominal cavity organs as a priority.

Among the patients examined 225 (67,9%) had various surgical interventions on the abdominal cavity organs in the anamnesis; 106 (42,1%) patients were newly diagnosed with hernias. According to Chervel J.P. and Rath A.M. (1999) classification, 212 (64.1%) patients had large (W3) and giant (W4) hernias. The vast majority of patients 265 (80.1%) had hernias along the midline of the abdomen. Of the 331 patients, 132 (39.9%) had recurrent hernias (Rn).

The main surgical condition in all patients was ventral hernia. It should be noted that out of 429 patients with ventral hernias operated on in the period 2017-2022, in 227 hernialloplasty was supplemented by surgical correction of concomitant abdominal organ pathology. According to our data, the incidence of simultaneous pathology in ventral hernias was 52.8%. Simultaneous pathology was diagnosed preoperatively in 74.6% and intraoperatively in 25.4%.

A total of 178 concomitant surgical pathologies were identified in the comparison group and 334 in the main group, some of them had two or more. Abdominal adhesions prevailed in 67 (37,6%) and 106 (46,7%) of them, obesity of III and IV stages and sagging abdomen in 32 (17,9%). with 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 surgical pathology of anterior abdominal wall (ligature fistulas and pseudocysts of anterior abdominal wall), pelvic organ pathology in women 33 (18,6%) and 70 (30,8%) respectively in comparison and main patient groups .

It should be noted, that the incidence of associated surgical pathology of the anterior abdominal wall and abdominal cavity organs increased proportionally in patients with increasing hernia size - at W3 - 59,6%, W4 - 66,3%.

Of the patients examined 208 (62,8%) had various concomitant somatic diseases of vital organs. Of these, 139 (41.9%) patients had two or more comorbid somatic diseases. Taking into account the ASA

classification, 178 (53.7%) patients were classified as class II, and 30 (9%) patients were classified as class III.

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

The method also allowed us to verify the presence of simultaneous pathology of the abdominal cavity organs. CTGA allowed us to identify defects in the topography of the anterior abdominal wall and choose the optimal method of plasty. If the relative volume of the hernial bulge was less than 5% of the abdominal cavity volume, the hernias were considered small. If the relative volume of herniotomy was from 5.1% to 14.0% of the abdominal cavity volume, they were considered to be the average hernias and the tension hernioallograft methods were preferred - the endoprosthesis "on lay" implantation with suturing of the defect.

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

Results and discussion.

Patients in the comparison group (n=104) underwent hernialloplasty in 62 (59.6%) patients with tension type and in 42 (40.4%) with non-tension type, i.e. tension type of plasty 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.

Patients in the 1st subgroup with a volume of herniotomy up to 14% of the abdominal cavity volume according to CTGA data underwent endoprosthesis "onlay" implantation with suturing 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 delineation by the hernia sac flap, the anterior abdominal wall plasty was performed by applying a mesh over the aponeurosis without suturing it. Endoprosthesis fixation was performed with U-shaped sutures. These sutures were preformed before the abdominal cavity was closed with a hernia sac flap, capturing all layers of the muscular-aponeurotic wall up to the peritoneum.

In 32 (17,7%) patients in the 3rd subgroup with the size of the hernial defect more than 10 cm and the volume of the hernial bulge more than 18% of the abdominal cavity volume according to CTGA data, we performed combined tension-free hernioplasty "onlay + sublay", that is, one implant was placed behind the muscular-aponeurotic layer after the abdominal cavity border with the hernial sac flap, the second implant was placed above the aponeurosis. After the abdominal cavity was delineated with peritoneum, an implant was cut out; its perimeter size was 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 greatly

simplified the technique of its fixation. Further, the endoprosthesis was placed according to the "sublay" type, the U-shaped sutures previously placed were passed through all layers over the aponeurosis and the second endoprosthesis was fixed to these sutures placed "onlay". The anatomical and physiological reconstruction of the anterior abdominal wall as well as the white line of the abdomen was of particular importance of this method. The use of this method in the clinic yielded a good functional result.

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

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

Laparoscopic prosthetic hernioplasty in ventral hernias was performed in 46 patients of the main group (20,3%) with small and medium hernias with the corresponding sizes of aponeurosis defects - up to 5 cm and from 5 to 10 cm using polypropylene implants according to "ipom" method (Laparoscopic Intra Peritoneal Onlay Mesh). Trocar insertion sites were standardized and chosen where it was more convenient and safe after simultaneous abdominal organ surgery.

34 (73.3%) out of 46 patients underwent laparoscopic prosthetic hernioplasty using standard polypropylene mesh implants, in 12 (26.7%) composite mesh implants "Physiomes" or "Prosid" (Ethicon) were used.

When using standard implants, the peritoneum was opened in the abdominal cavity, the hernia sac was isolated and a "pocket" was created in the preperitoneal space with 5-6 cm indent from the hernia gate along the perimeter. Then 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 pressed to the anterior abdominal wall using ligatures tied around the edges of the implant.

Suturing of the implant to the anterior abdominal wall was performed using our modified Endo Close needle. The use of the modified Endo Close needle was more convenient for the surgeon and safer for the patient than stitching the peritoneum intracorporeally. The use of composite mesh implants "Physiomes" or "Prosid" (Ethicon) in 12 (26.7%) patients allowed us to avoid creating a preperitoneal "pocket" before fixing the prosthesis to the anterior abdominal wall.

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

Since in all patients the main pathology was ventral hernia and the simultaneous pathology was a surgical disease of the abdominal cavity organ, when choosing the surgical access we first of all considered the location of the hernia gate, then the location of the organ with 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. Localization 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 guided by the topographic division of the abdominal cavity into 9 regions. When performing simultaneous surgeries in the comparison group, only traditional wide accesses were used, i.e., the herniolaparotomy was extended to the epigastric or hypogastric region, which allowed the surgeon to perform the simultaneous stage of surgery. At the same time, the liquidation of the herniotomy defect took a lot of time and the duration of the operation increased significantly. Besides, it had a number of serious drawbacks - high traumatic nature of the operation, increased risk of postoperative wound and general complications, unsatisfactory cosmetic results, a long

period of early rehabilitation, etc. And if surgical diseases were located at a wide distance from each other, each pathology was operated on through separate accesses. In general, in the comparison group of patients 83 (79,8%) - simultaneous operation was carried out through the unified herniolaparotomy access, 21 (20,2%) patients underwent simultaneous operation through 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 accesses using EVX. LCE was performed in 19 of these patients, 11 patients underwent supravaginal amputation or hysterectomy for myoma, 7 patients underwent ovarian cystectomy, 2 patients underwent cyst fenestration from the liver, and 27 patients underwent adhesiolysis for abdominal commissural disease and chronic intestinal obstruction. The 2nd stage of the operation was completed by laparoscopic hernioplasty.

In 39 (17,6%) patients of the main group 1-stage simultaneous pathology was corrected laparoscopically; the main stage of surgery - hernioplasty was carried out from the herniolaparotomy access. 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%) out of 227 patients in the main group; 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 performed using herniolaparotomy access. The reason for this was the close proximity of abdominal organ pathology to the herniotomy defect. Dermatolipidectomy was performed in 67 (29,5%) patients of the main group who had concomitant pathology in the form of obesity of II-III degree after the anterior abdominal wall plasty.

In the main group with the location of the simultaneous pathology at a wide distance from the hernia defect, simultaneous stages of surgery were performed with the use of laparoscopic technique in 85 (37,5%) patients, that is, in 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. There were equal indices in both groups of patients according to the number of complications (Criterion $\chi^2=4,043$; Df=1; p=0,045).

When considering time periods, it was noted that improvement of tactical and technical aspects ensured reduction of all major perioperative periods).

We analyzed distant results 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 1 (0,9%) had complications after the simultaneous stage of the operation - an external biliary fistula after hepatic echinococectomy.

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 $8,3\pm 0,6$ days in the main group ($10,2\pm 0,4$ days in the comparison group), the average duration of operation in the main group of patients was $58,5\pm 4,1$ minutes ($72,5\pm 3,4$ days in the comparison group). Analysis of patients' quality of

life showed that optimization of tactical and technical aspects of simultaneous surgical correction of ventral hernia and combined abdominal pathology with the priority use of endovideosurgical techniques and non-tensioned alloplasty methods allowed increasing the proportion of positive treatment results up to 98,7%.

Conclusions

1. According to our study, simultaneous abdominal 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 most frequently. With increasing hernia size, the number of patients requiring simultaneous interventions increased, so 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) the simultaneous stage with laparoscopic technique is preferred, which was successfully performed in 37,5% of patients, i.e. in more than 1/3 of patients of 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 the use of composite mesh implants as well as the use of modified Endo Close needle with extracorporeal knotting at the stage of prosthesis fixation significantly simplifies the operation technique.

4. CT hernioabdominometry allows to identify defects of anterior abdominal wall topography and choose an optimal method of plasty. If the volume of herniotomy according to CTGA is up to 14% of the abdominal cavity volume, "onlay" endoprosthesis implantation with suturing of herniotomy defect is possible, with 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 W3,W4 hernias permitted to avoid development of compartment syndrome and to level herniotomy 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, the patient's recovery from several surgical diseases within one anesthetic aid and surgical intervention substantiates the necessity of simultaneous operations.

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