



CLINICAL FEATURES OF IMPINGED VENTRAL HERNIAS COMPLICATED BY INTESTINAL OBSTRUCTION

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Article history:

Received: May 7th 2024

Accepted: June 4th 2024

Abstract:

The study utilized retrospective and prospective data from 242 patients who underwent surgery for anterior abdominal wall impingement hernias complicated by intestinal obstruction. Regardless of the type and size of pinched ventral hernias, high intra-abdominal pressure (IAP) with risk of enteral and multi-organ failure is an indication for the use of non-tension plasty techniques. PSC can be prevented by enteral intubation. In the main study group, there was a significant ($p < 0.05$) trend of IAP reduction as a result of the use of non-tension plasty and enteral intubation. In the comparison group, the baseline value of 19.3 ± 1.6 decreased to 17.1 ± 1.3 after surgery, and in the main group, the baseline value of 18.8 ± 1.8 decreased to 14.5 ± 1.3 mmHg. The resolution of bowel paresis and obstruction can be effectively monitored by abdominal ultrasonography.

Keywords: Pinched ventral hernia, intestinal obstruction

INTRODUCTION. Treatment of pinched hernias of the anterior abdominal wall is one of the important areas of emergency surgery, which has received much attention in studies and publications. These hernias complicate the course of disease in 10-17% of hernia patients and rank second among acute abdominal surgical diseases after acute appendicitis. Nevertheless, mortality from pinched hernias is 15-16 times higher than from acute appendicitis.

Statistics of leading research and treatment institutions show that, despite the achievements, surgical treatment of patients with impingement hernia of the abdominal wall gives unsatisfactory results. Postoperative complications reach 50%, and lethality ranges from 2 to 4 percent. This is due to the high frequency of impingement of intestinal loops, leading to strangulation intestinal obstruction (more than 70%), as well as a large number of elderly patients (about 40%). Incorrect choice of the plasty method, significant tension of the abdominal wall tissues, abdominal cavity volume reduction and development of abdominal compartment syndrome in 0.8-12% of the operated patients are the main reasons of unsatisfactory results of the operation.

OBJECTIVE OF THE STUDY. Creation of the strategy for diagnostics and carrying out of operations at the pinched ventral hernias complicated by intestinal obstruction, including the choice of the method of hernioalloplasty.

Material and methods. The work is based on the results of retrospective and prospective study of 242

patients operated on for impingement hernias of the anterior abdominal wall of various localizations, complicated by the development of intestinal obstruction, who were on inpatient treatment in Navoi branch of the RSCEMP in 2018-2023. The patients were subjected to clinical observation and divided into two groups depending on the nature and volume of surgical intervention.

The main group consisted of 136 patients with pinched hernias of the anterior abdominal wall complicated by intestinal obstruction who underwent surgery using synthetic implants (the method of "non-tension" hernioplasty). In this group there were patients with different localization of hernias: 46 (33.8%) with pinched inguinal hernias, 38 (27.9%) with pinched umbilical hernias and 52 (38.2%) with pinched postoperative ventral hernias.

The control group included 106 patients with pinched hernias of the anterior abdominal wall complicated by intestinal obstruction who underwent conventional autoplasty ("tension" hernioplasty). This group also consisted of patients with different localization of hernias: 30 (28.3%) with pinched inguinal hernias, 34 (32.1%) with pinched umbilical hernias and 42 (39.6%) with pinched postoperative ventral hernias.

In the main group, the mean age of the patients was 56.4 years (plus or minus four years), with ages ranging from 28 to 81 years. There were 74 females (54.4%) and 62 males (45.6%). In the control group, the mean age of the patients was 57.6 (plus or minus

3.1) years, with an age range of 27 to 78 years. There were 50 males (47.2%) and 56 females (52.8%).

Most of the surgical patients in the older age group had serious comorbidities that affected the course and outcome. 82% of people in this age group had 2-3 comorbidities. Based on the history, the duration of hernia wear prior to hospitalization ranged from 1 to 20 years, with a total duration of 9.5 + 1.7 years.

Since the onset of impingement, the patients admitted by emergency to the emergency room of the Samarkand branch of the RSCMP had different periods of time. The time of hospitalization in the main group ranged from 4 to 144 hours, with a total duration of 27.1 plus or minus 8.4 hours. Six (8.8%) patients were admitted within the first six hours; from six to twelve hours, 46 (33.8%); from twelve to twenty-four hours, 38 (27.9%); and 20 (29.4%) patients were admitted after impingement 24 hours later. Hospitalization time in the control group ranged from 3 to 144 hours, with a mean length of stay of 22.6 plus or minus 6.8 hours. Within the first six hours, 6 (11.3%) patients were hospitalized; from six to twenty-two hours, 42 (39.6%); from twenty-two to twenty-four hours, 30 (28.3%); and

after 24 hours from the time of impingement, 22 (20.8%) patients were hospitalized.

238 (98.3%) patients reported that treatment of the previously freely repositioned hernia was not possible. They also reported that the hernia became more painful and increased in volume. In 230 patients (95.1%), no "coughing tremor" was observed on palpation. Nausea in 136 (55%) patients, vomiting that recurred prehospital and recurrently in 92 (37%) patients, delayed passage of stool and gas in 64 (26%) patients and increased peristalsis in 34 (14%) patients. 28 (11%) patients showed peritoneal symptoms and 10 (4%) patients noted skin discoloration over the hernial bulge.

Radiologic examination was performed in 188 (75%) patients admitted to the hospital who had a pinched hernia of the anterior abdominal wall that was complicated by intestinal obstruction. Abdominal radiographs showed that 53.1% of patients had evidence of low small bowel obstruction with multiple horizontal fluid levels in dilated loops of the small intestine. In 26.6% of patients there were signs of high small intestinal obstruction on X-rays.

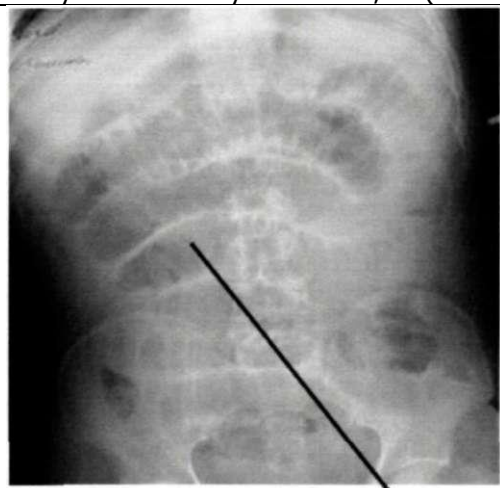


Fig. 1. Patient D., 51 years old. Radiologic picture of a pinched inguinal hernia with signs of small intestinal obstruction (direct projection)

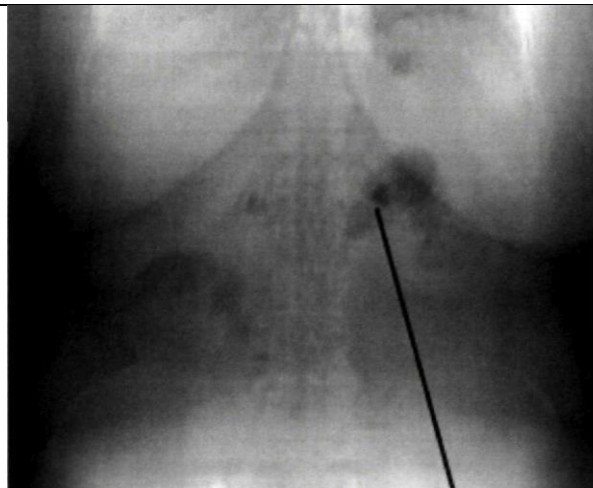


Fig. 2. Patient A., 63 years old. Postoperative ventral hernia with radiologic signs of intestinal obstruction (direct projection).

Ultrasound examination was performed in 166 patients with complicated pinched hernias (68.8%) in the hospital. In 92 (92%) patients of the main group and 68 (94%) of the control group, an increase in the diameter of the leading intestinal segment with wall thickening was found, as well as "pendulum-like" movements of the intestinal contents and sleeping intestinal loops of the leading segment. The appearance

of signs of free fluid in the lateral canals and interesophageal spaces was accompanied by a number of complications. 52 (52%) patients of the main group and 42 (58%) patients of the control group showed ultrasound signs characteristic of impinged hernias complicated by peritonitis and intestinal necrosis.

In 48 (35.2%) cases of the main group and 42 (39.6%) cases of the control group, the contents of the

hernial bulge were found to be a pinched loop of intestine (Figure 3, 4). In 36 (36%) and 30 (42%) cases respectively. In 36 (36%) cases of the main group and 30 (42%) cases of the control group, loops of small

intestine and omentum were found. Hernia was found in 34 (34%) patients of the main group and 32 (44%) of the control group.



Fig. 3. Patient R., 52 years old. Ultrasound: A pinched ventral hernia: the hernial gate is located, in which a fragment of small intestine with fluid content, without peristalsis, comes out. Blood flow in the wall is not registered. Fluid in the hernia sac is detected.



Fig. 4. Patient Zh., 71 years old. Ultrasound: A pinched right inguinal hernia: In the right inguinal region there is a hernia gate up to 1.5 cm, into which a fragment of small intestine with a diameter of 3.2 cm, wall 0.3-0.4 cm, blood flow in the wall and peristalsis are not registered, the content is fluid. Hernia water of heterogeneous character is detected.

In both groups of patients with impinged hernias complicated by bowel obstruction, 92 (36.3%) patients had serious systemic diseases that posed a significant risk for the anesthetic procedure. Multicomponent endotracheal anesthesia was used for the majority of operations (208, or 85.9%). Surgery was performed under spinal anesthesia in 20 patients with pinched inguinal hernia (8.2%). Surgery was performed under local infiltration anesthesia using 0.5% Novocain solution with intravenous potentiation in fourteen patients (5.6%) who were high risk according to the ASA classification.

In the main group of patients with impingement hernia, 62 (42%) patients had isolated small bowel impingement in 46 (36%), small bowel impingement with omentum in 18 (14%), and colonic impingement in 10 (8%). In the control group, small bowel impingement was also frequently observed in 42 patients (45.3%), small bowel and omentum impingement in 36 (29.3%), small and colon impingement in 18 (16.7%), and colon impingement in 10 (9.4%) patients. In the main group, 18 cases of non-viable omentum and small intestine, 28 cases of necrotized small intestine and 2 cases of colon. In the

control group, ten patients received resections of necrotized omentum and small intestine, twenty-six of them received resections of small intestine and two patients received resections of colon. A total of 86 (35.5%) patients underwent bowel resection due to impaction and necrosis. Eighty-two patients had small bowel resection and 4 patients had colon resection.

In the control group, traditional plastic methods were used for surgical treatment of pinched hernias without the use of synthetic implants. Treatment of impinged inguinal hernias included the Bassini (12 cases) and Postemski (18 cases) methods, and the Meyo (38 cases) and Sapejko (62 cases) methods for the treatment of POVH and impinged umbilical hernias. In six cases with giant ventral hernias, decompressive surgery was performed to repair the wound.

RESULTS AND THEIR DISCUSSION. The group of patients who underwent surgical treatment of impingement hernias mainly utilized various methods of "non-tension" plasty of the anterior abdominal wall. These techniques were well established in previous hernia surgeries and were well-tested.

In 60 patients who underwent surgery for a pinched postoperative ventral hernia complicated by



intestinal obstruction, a study was conducted to investigate the effect of the level of intra-abdominal pressure. Of these, 32 patients in the main group undergoing "non-tension" hernioplasty and 28 patients in the control group undergoing "tension" hernioplasty were studied. Of the 60 patients studied, 52 (86.7%) had grade II or III intra-abdominal pressure. In the main group the initial levels of intra-abdominal pressure were 18.8 ± 1.8 mmHg, whereas in the control group they were slightly higher, amounting to 19.3 ± 1.6 mmHg ($p > 0.05$).

In the patients of the main group by the end of the operation there was a clear decrease in the level of intra-abdominal pressure ($p < 0.05$) as a result of decompression of the gastrointestinal tract and the use of "non-tension" plasty. In the control group, the mean intra-abdominal pressure was lower (17.1 ± 1.3 mmHg). Both groups of patients showed an increase in intra-abdominal pressure up to three days postoperatively. On the first day after surgery, the intra-abdominal pressure in the main group was 15.6 ± 1.5 mmHg and in the control group 17.8 ± 1.1 mmHg. On the second day after surgery, the mean intra-abdominal pressure was 15.9 ± 0.8 mmHg in the main group and 18.3 ± 0.7 mmHg in the control group. On the third day, the mean intra-abdominal pressure in the main group was 16.2 ± 0.7 mmHg and in the control group 18.9 ± 0.7 mmHg. On the fourth day, the intra-abdominal pressure level decreased to 13.3 ± 0.8 mmHg in the main group and to 16.9 ± 0.7 mmHg in the control group.

Pearson correlation coefficient ($r = 0.85$ at $p < 0.05$) confirmed the positive correlation between the initial level of intra-abdominal pressure (IAP) and the volume of removed fluid through the external-enteral probe (EEP) during the operation. The reduction in IAP level after surgery was made possible by the use of the NEZ. With statistically significant differences, there was an increase in IAP up to three days within four days postoperatively ($p < 0.05$). In addition, the volume of intestinal secretion through the NEZ increased by three days. However, the difference in the volume of fluid evacuated postoperatively was not statistically significant. Thus, the use of NEZ reduces IAP by removing intestinal contents.

The results of abdominal ultrasonography performed early postoperatively in 28 patients out of 250 patients who underwent surgery for impingement hernias complicated by intestinal obstruction were analyzed to evaluate the reversal of small bowel obstruction in the postoperative period.

Of a total of 28 patients who underwent surgery, 24 ultrasound studies were performed. Of the 20 studies performed from day 2 to day 5

postoperatively, 18 showed the use of nasoenteric intubation of the small intestine. Gas in the loops of the small intestine was detected in all 28 patients between 2 and 10 days postoperatively. Of the 28 patients who were analyzed on the second and third day after surgery, four had accumulation of gas and liquid contents in the lumen of multiple loops of the small intestine. Changes such as dilatation of the small intestine lumen to 4.0-5.0 cm, moderate thickening of the walls and folds, and formation of multiple horizontal levels of fluid and small amounts of gas in the right sides of the colon were observed. Patients with severe symptoms of intestinal obstruction had these changes preoperatively and had a prolonged period of obstruction (10-34). The following dynamic follow-up showed that the amount of gas in the loops of the small intestine decreased, that horizontal fluid levels decreased, that wall and fold edema decreased, and that there was gas in the colon overall.

In 24 patients, changes in the small intestine included gas in individual loops (22 of 24 cases), which formed either isolated clusters (8 cases) or single loops with gas ranging from 1.5 to 3 cm in diameter (14 cases). However, five patients had no horizontal fluid levels and nine patients had indistinct fluid levels in the lumen. Thickening of the mucosal folds in single loops of small intestine was found on day four postoperatively in a patient with bowel obstruction that had persisted for more than four days and was the result of a ventral hernia. All patients had moderate gas volume in the colon along its entire length.

Among the eight patients who underwent surgery for anterior abdominal wall impingement hernias complicated by intestinal obstruction, the overall mortality rate was 3.3%. The postoperative lethality in the control group amounted to 5.7% (6 patients), whereas in the main group it was 1.5% (2 patients). In the control group, the cause of death in two cases was pulmonary embolism, and in the remaining four cases, the cause of death was acute cardiorespiratory failure due to artificial ventilation and bilateral pneumonia caused by increased intra-abdominal pressure. In the main group, both deaths were due to acute myocardial infarction. Five of the eight deaths occurred in patients over seventy years of age with impingement lasting more than one day.

CONCLUSIONS.

1. In cases of impinged ventral hernias of any type and size, the use of non-tension plasty techniques is indicated because of the increased intra-abdominal pressure that can lead to enteric and multi-organ failure. Intestinal failure syndrome can be prevented by enteral intubation.



2. In the main study group, there was a significant trend of IAP decrease ($p < 0.05$) with NEI and non-tension plasty. In the comparison group, IAP dropped from baseline value of 19.3 ± 1.6 to 17.1 ± 1.3 mmHg postoperatively, whereas in the main group it dropped from 18.8 ± 1.8 to 14.5 ± 1.3 mmHg with a similar trend over the next three days. Abdominal ultrasound can be used to effectively monitor the resolution of bowel paresis and obstruction.

3 The treatment algorithm for patients with pinched hernias complicated by intestinal obstruction, taking into account the degree of enteral insufficiency, IAP level, type and size of hernias, can reduce the incidence of abdominal complications from 20.7% to 4.4%, general postoperative complications from 28.3% to 11.3%, mortality from 5.2% to 1.5% and wound complications from 28.3% to 8.8%.

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