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RESULTS OF LAPAROSCOPIC TREATMENT OF POSTOPERATIVE INTRAPERITONEAL BLEEDING

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The effectiveness of endovideosurgical treatment of intra-abdominal bleeding after abdominal operations was compared. The main group (n=85) included patients who underwent endovideosurgery for early postoperative bleeding, and the control group (n=44) included patients who used traditional methods of surgical correction. In 85 patients of the main group, laparoscopic hemostasis was attempted by clipping, suturing, electrocoagulation and joint methods. In the control group, a traditional relaparotomy was performed. Laparoscopy made it possible to avoid relaparotomy in 67 (78.8 %) of 85 patients, as well as to exclude intra-abdominal bleeding in 7 (8.2 %) patients. Indications for relaparotomy were revealed in 11 (12.9 %) observations during diagnostic laparoscopy. The average duration of laparoscopic surgery in the main group (33.1±22.8 min) was significantly reduced compared to the duration of relaparotomy in the control group (72.4±28.4 min). The lethal outcome in the control group was 4.5 % (2/44). No deaths were registered in the main group. The use of laparoscopy in the diagnosis and treatment of postoperative intra-abdominal bleeding does not exclude traditional surgical interventions and should be used if laparoscopic treatment is impossible or ineffective.

Key words: postoperative complications, intra-abdominal bleeding, endoscopic treatment, endovideosurgery, laparoscopic hemostasis.

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РЕЗУЛЬТАТИ ЛАПАРОСКОПІЧНОГО ЛІКУВАННЯ ПІСЛЯОПЕРАЦІЙНИХ ВНУТРІШНЬОЧЕРЕВНИХ КРОВОТЕЧ

Проведено порівняння ефективності ендовідеохірургічного лікування внутрішньочеревних кровотеч після абдомінальних операцій. До основної групи (n=85) увійшли пацієнти, яким застосовували ендовідеохірургію з приводу ранньої післяопераційної кровотечі, у контрольну групу (n=44) – пацієнти, які застосовували традиційні методи хірургічної корекції. 85 хворим основної групи зроблено спробу лапароскопічного гемостазу кліпуванням, ушиванням, електрокоагуляцією та суглобовими методами. У контрольній групі виконано традиційну релaparотомію. Застосування лапароскопії дозволило уникнути релaparотомії у 67 (78.8 %) з 85 хворих, а також виключити внутрішньочеревну кровотечу у 7 (8.2 %) хворих. Показання до релaparотомії виявлено в 11 (12.9%) спостереженнях під час проведення діагностичної лапароскопії. Середня тривалість лапароскопічної операції в основній групі (33.1±22.8 хв) значно скоротилася порівняно із тривалістю релaparотомії у контрольній групі (72.4±28.4 хв). Летальний результат у контрольній групі становив 4.5 % (2/44). Летальних результатів у основній групі не зареєстровано. Застосування лапароскопії у діагностиці та лікуванні післяопераційних внутрішньочеревних кровотеч не виключає традиційних оперативних втручань і повинно застосовуватись при неможливості або неефективності лапароскопічного лікування.

Ключові слова: післяопераційні ускладнення, інтраабдомінальні кровотечі, ендоскопічне лікування, ендовідеохірургія, лапароскопічний гемостаз.

Early postoperative complications in abdominal surgery reflect its most dramatic aspect. This is primarily due to the frequency of its pathologies, which does not tend to decrease [1, 2]. Suffice it to say that the frequency of relaparotomies ranges from 0.5 % to 8.6 % of the total number of abdominal operations. The generally recognized reasons for unsatisfactory results of treatment of intra-abdominal complications are their untimely detection and postponement of repeated operations [3, 13]. This underlines the importance of improving early diagnosis and surgical intervention in this category of patients. According to the majority of authors [4, 5], the unsatisfactory results of repeated operations are based on errors in the diagnosis of complications in the abdominal cavity and delayed relaparotomy. The number of undetected complications after intra-abdominal operations reaches 17.8–29.7 % [1, 8, 12], and in 0.6–17 % of cases, relaparotomy is performed unreasonably [14]. In addition, the development of complications in the abdominal cavity is accompanied by a violation of homeostasis, and the correction of the pathology that has arisen is often intolerable for the patient in conditions of high traumatism [2, 5, 7]. Therefore, the development of new highly informative and minimally invasive methods of diagnosis and treatment of postoperative complications that can cause minimal homeostatic disorders is one of the main tasks of modern surgery [6, 13].

Bleeding into the gastrointestinal tract or free abdominal cavity in the early postoperative period is one of the most dangerous complications. According to many authors, the most accurate method of examining intra-abdominal fluid is ultrasound, which has an accuracy of 57–96 % and a sensitivity of 91.5 % [4, 6].

In recent years, the main method of surgical intervention on the organs of the abdominal cavity and pelvis is the laparoscopic pathway. The frequency of damage to the aorta, iliac arteries and veins, inferior

vena cava during laparoscopy is 3–7 per 10,000 operations. At the same time, 10–50 % of patients die. Until 1995, in the literature for 700,000 laparoscopic cholecystectomy operations, 25 (0.03 %) cases of damage to the main vessels of the retroperitoneal space were described, which 5 patients died [9, 10]

However, according to the literature, limited liquid derivatives (abscesses, hematomas, bilomas, exudates and transudate cavities) do not have specific ultrasound signs [7]. Therefore, for the differential diagnosis of intra-abdominal fluid accumulation, it is important to perform puncture and relaparoscopy under the control of ultrasound [4, 8,13].

The nature of the source of intra-abdominal bleeding depends on the type of initial surgical intervention, and in some clinical cases, it is not possible to verify the source due to spontaneous cessation of bleeding during repeated surgical interventions [2, 19].

In the postoperative period, intra-abdominal bleeding develops in 0.06-0.28 % of operated patients and accounts for 4.4–29.9 % in the structure of postoperative abdominal complications [3]. Currently, endovideosurgery is widely used for the treatment of postoperative intra-abdominal bleeding. According to a number of authors, laparoscopic intervention is indicated in patients with reduced hemodynamic parameters, and in other clinical cases, urgent relaparotomy is indicated [4, 9, 13].

The purpose of the study was to compare the effectiveness of endovideosurgical methods for diagnosing intra-abdominal bleeding after abdominal operations.

Materials and methods. The studies were carried out in 2010–2021 at the clinical bases of the departments of General Surgery of the Azerbaijan State Institute of Advanced Medical Training named after A. Aliyev. The results of retrospective cohort studies of the anamnesis of patients aged 18–87 years who were hospitalized for various operations performed on abdominal organs and who developed gastrointestinal or intra-abdominal bleeding in the postoperative period, as well as prospective data obtained during the study, are presented. The main group included patients with a burdened course in the early postoperative period after abdominal operations, who preferred the active use of endovideosurgery in surgical tactics and treatment of complications (n=85). The control group included patients (n=44) whose primary surgical interventions and the structure of postoperative bleeding were similar to the main group but used traditional open surgical methods of correction.

Criteria for inclusion in the study. The study included all patients who developed bleeding in the early postoperative period after abdominal surgery.

Criteria for exclusion from the study. Patients whose general condition was critical at the time of admission to the surgical hospital were not included in the study.

The mean age in the main group of patients was 54.1 ± 8.5 years, in the control group – 51.9 ± 6.7 years ($p < 0.05$). The total mean age of patients included in the study groups was 52.6 ± 8.2 years. The ratio of men and women was approximately 2:3. The traditional examination of patients was carried out according to a generally accepted scheme using traditional laboratory and instrumental diagnostic methods, including endoscopic, X-ray and ultrasound examinations.

The presence of clinical signs of intra-abdominal bleeding in 85 patients in the postoperative period was indicated for laparoscopy. Laparoscopic hemostasis was attempted in all observations by clipping, suturing, electrocoagulation and joint methods.

Statistical analysis of all indicators obtained during the study was carried out taking into account modern recommendations. To determine the difference in indices, a nonparametric method was used – the Wilcoxon (Mann–Whitney) criterion.

Results of the study and their discussion. Therapeutic and diagnostic endosurgical interventions were performed for intra-abdominal bleeding after both traditional laparotomy and minimally invasive interventions. Although the main clinical manifestations of postoperative intra-abdominal bleeding occur in the form of hemodynamic disorders with a decrease in blood pressure, in some patients there is not a clinically significant drop in blood pressure, but bleeding from the drainage tube into the abdominal cavity, pallor of the skin and mucous membranes, dry mouth. Weakness manifests itself in the form of non-localized abdominal pain. Some observations also revealed positive peritoneal symptoms. Laboratory tests were not always informative, as some patients had a decrease in the number of red blood cells, while others did not have full-fledged anaemia due to low bleeding intensity.

In the main group, the state of the hemostasis system was studied in all patients with postoperative bleeding. On the basis of the coagulogram, the state of the total coagulation activity of the blood was assessed, the amount of fibrinogen in the plasma was determined. Great importance was attached to the study of the composition of erythrocytes in dynamics. In addition to clinical and laboratory signs of intra-abdominal bleeding, the presence of signs of fluid accumulation in the abdominal cavity on ultrasound, as well as the removal of more than 200 ml of blood from the drainage tube stored in the abdominal cavity for 2 hours after surgery was considered the main indication for laparoscopy.

Therapeutic laparoscopy or relaparotomy was used for hemostasis in 85 patients with a clinical picture of postoperative intra-abdominal bleeding. Relaparotomy was performed in all 44 cases in the control group.

In the main group, repeated therapeutic and diagnostic endosurgical interventions were performed for both post-laparotomic and post – invasive complications. The types of primary operations and their number in the main group were as follows: laparoscopic cholecystectomy in 23 of 85 patients (27.1 %), minilaparotomic cholecystectomy in 5 (5.9 %), traditional cholecystectomy in 18 (21.1 %), left hemihepatectomy in 4 (4.7 %), diagnostic laparoscopy in 5 (21.1 %), diagnostic laparoscopy with puncture liver biopsy in 5 (21.1 %), ulcer surgery duodenal surgery for the disease was performed in 8 (9.4 %), splenectomy in 1 (1.2 %), hernia removal surgery in 1 (1.2 %), gynecological surgery in 15 (17.6 %). In the control group, laparoscopic cholecystectomy was performed in 4 out of 44 patients (9.1 %), minilaparotomic split cholecystectomy in 6 (13.6 %), traditional cholecystectomy in 11 (25.0 %), left-sided hemihepatectomy in 1 (2.3 %), duodenal ulcerative surgery was performed in 14 (31.8 %), hernia removal surgery in 2 (4.5 %), gynecological surgery in 6 (13.6 %).

We did not use additional screening methods in cases with clinically significant symptoms of intra-abdominal bleeding and performed laparoscopic intervention in the absence of contraindications. Ultrasound examination was performed in patients with suspicious clinical and laboratory data, in which free fluid was found in one or more abdominal cavity sections.

Complications with bleeding were excluded in 7 (8.2 %) of 85 patients, despite a decrease in blood pressure and hemoglobin levels.

Laparoscopic intervention in 23.1 % (18/78) of cases in the first hours of the postoperative period, 46.2 % (36/78) of cases on the first day of the postoperative period, 21.8 % (17/78) of cases on the second, 3.8 % (3/78) on the third day, 2.6 % (2/78) on the fifth and 2.6 % (2/78) on the sixth day.

The volume of blood found in the abdominal cavity, including clots, ranged from 30 ml to 2000 ml. Symptoms of ongoing bleeding (predominance of a large amount of liquid blood with a small amount of clot) in 49 (62.8 %) of 78 patients, as well as signs of stopped bleeding (presence of a large number of blood clots with a small amount of liquid blood in 29 (37.2 %)). Hemostasis from 78 clinical cases in 38 (48.7 %) – electrocoagulation, 17 (21.8 %) – clipping, 14 (17.9 %) – suturing, 9 (11.5 %) – mini-laparotomy incision performed with a tampon.

The sources of persistent intra-abdominal bleeding from 49 patients with a gallbladder bed were 7 (14.3 %), bleeding from clipped cystic arteries in 5 (10.2 %) and vessels in the projection of the hepatic-duodenal ligament in 7 (14,3 %), 8 (16,3 %) postoperative ulcers of the anterior abdominal wall, 5 (10.2 %) liver tissue, 3 (6.1 %) ovaries, 6 (12.2 %) uterine muscles, thick veins, 2 (4.1 %) large fatty vessels, 2 (4.1 %) abscess cavity, 1 (2.0 %) splenic veins, 2 (4.1 %) strained peritoneal hematomas and 2 (4.1 %) small intestinal hematomas.

In 29 patients with bleeding arrest, the source of bleeding was detected in 41.4 % (12/29) of cases of gallbladder bed, in 13.8 % (4/29) of cases of liver tissue damage, in 17.2 % (5/29) of ovarian cases. insufficiency, 6.9 large (2/29) cases of large fatty vessels, 3.4 % (1/29) cases of abscess cavity, 6.9 % (2/29) cases of peritoneal hematoma and 10.3 % (3/29) cases of small intestine disease formed hematoma.

After determining the feasibility of therapeutic laparoscopy, blood and blood clots were evacuated from the abdominal cavity, the abdominal cavity was washed and sanitized, and an adequate field of vision was provided for surgical intervention.

During the study, laparoscopy in patients with postoperative intra-abdominal bleeding was recommended: 1) intra-abdominal bleeding in hemodynamically stable patients; 2) questionable clinical and laboratory signs of intra-abdominal bleeding, despite confirmation of the presence of free fluid in the abdominal cavity during ultrasound.

Contraindications to laparoscopy are: 1) patients in critical, terminal condition; 2) maintenance of hemodynamic instability in patients with intensive preoperative preparation.

Intensive blood drainage, a rapid decrease in hemodynamic parameters, a sharp decrease in hematocrit and circulating blood volume are considered indications for emergency relaparotomy, since endosurgical identification of the source of bleeding and stopping bleeding is accompanied by a great loss of time.

The transition from laparoscopy to relaparotomy in patients with postoperative intra-abdominal bleeding included: 1) the inability to identify the source of bleeding; 2) the ineffectiveness of endosurgical hemostasis; 3) the occurrence of complications that cannot be eliminated by minimally invasive correction during laparoscopy.

According to the results of the diagnostic stage of laparoscopic intervention, bleeding complications were excluded in 7 (8.2 %) of 85 cases, relaparotomy was recommended in 11 (12.9 %), of

which 5 (5.9 %) did not master the operation. The method coincided with the period when we used laparoscopy only for diagnostic purposes.

In 11 (14.1 %) of 78 patients operated in the main group, the indications for relaparotomy were as follows: 2.6 % (2/78) of patients with continued bleeding in the gallbladder bed due to the impossibility of hemostasis, 5.1 % (4/78) extensive pronounced hematoma (diseases of the peritoneum and small intestine) 3.8 % (3/78) of patients with a large defect of the muscular layer of the uterus after conservative myomectomy and requiring careful examination and suturing, 2.6 % (2/78) massive arterial bleeding in a patient after splenectomy and the impossibility of its endosurgical stop.

After determining the feasibility of therapeutic laparoscopy, blood and blood clots were first evacuated to create an adequate field of vision in the intervention area. Bleeding from the gallbladder bed was observed in 24 (30.8 %) of 78 patients. In 14 of them (58.3 %), hemostasis was performed by electrocoagulation, in 3 (12.5 %) – by tamponade of a minilaparotomic incision, in 5 (20.8 %) – by clipping. Due to the ineffectiveness of endoscopic hemostasis, conversion to relaparotomy was performed in 8.3 % (2/24) of cases. In 11.5 % (9/78) of patients with bleeding from vessels in the projection of the hepatic–duodenal ligament, clipping of bleeding vessels was performed. In all cases, the bleeding was stopped, there were no relapses, and relaparotomy was not performed.

Bleeding from abdominal wall ulcers was observed in 11.5 % (9/78) of cases. To stop bleeding, 6 out of 9 patients (66.7 %) had additional hemostatic sutures, and in 2 (22.2 %) clinical cases electrocoagulation was performed, of which 1 (11.1 %) had additional clipping.

Hemorrhage from liver tissue was detected in 11.5 % (9/78) of cases. In 55.6 % (5/9) of cases, bleeding after puncture biopsy was stopped by electrocoagulation, and in 22.2 % (2/9), bleeding (after left-sided hemihepatectomy) was stopped by suturing. After one left-sided hemihepatectomy and one puncture liver biopsy on the background of cirrhosis, conversion to relaparotomy was performed in 2 (22.2 %) clinical cases due to the ineffectiveness of hemostasis.

Electrocoagulation of bleeding sites was performed in 10.3 % (8/78) of patients with ovarian bleeding; hemostatic measures were effective in all cases.

Bleeding from the vessels of the muscular layer of the uterus was detected in 8.9 % (7/78) of cases, while electrocoagulation and suturing were effective in both cases 28.6 % (2/7). In 42.9 % (3/7) of cases, a relaparotomy was recommended due to a large defect in the muscular layer of the uterus.

Bleeding from the vessels of the large omentum was detected in 7.7 % (6/78) of cases. Bleeding was stopped in 33.3 % (2/6) of cases by coagulation and (2/6) clipping, in 16.7 % (1/6) by suturing and (1/6) by tamponade from a minilaparotomy incision.

Bleeding from the abscess cavity occurred in 5.1 % (4/78) of cases. In 50 % (2/4) of patients, the abscess cavity was thoroughly sanitized and examined, the bleeding sites were coagulated, and the cavity was drained. In 25 % (1/4) of the observations, tamponade of the abscess cavity from a minilaparotomy incision was performed, and in 25 % (1/4) relaparotomy was performed due to the inefficiency of hemostasis.

The comparison of indices in the main and control groups is shown in the table 1.

Table 1

Comparison of surgical interventions for postoperative intra-abdominal bleeding

Index	Study groups		Statistical significance of the difference p
	The main group (n=85)	Control group (n=44)	
The Relaparotomy: Conversion	11 (12.9 %)	–	–
Complications	2 (2.3 %)	9 (20.4 %)	–
Deaths	0	2 (4.5 %)	–
Preoperative period was uneventful (M±m), d	1.3±0.6	2.4±1.1	0.0356*
Operating time (M±m), min	33.1±22.8	72.4±28.4	0.0066*
Duration of hospital stay (M±m), d	12.3±3.8	19.5±7.4	0.0264*

Note: * -Mann-Whitney criterion

Currently, for the diagnosis of intra-abdominal bleeding (IBD) modern high – tech diagnostic techniques are increasingly being used – ultrasound, CT and endovideosurgical technologies that allow not only to establish the cause and source of IBD, but also at the same time without operative access, that is, with minimal trauma for patients, to perform therapeutic manipulations, and when severe injuries and profuse IBD are detected, to set indications for laparotomy. Changes in hemodynamic parameters (tachycardia, decrease in blood pressure) are crucial for the diagnosis of intra-abdominal bleeding and are most pronounced with its intensive nature [2].

Laparoscopy is a universal and highly informative method of instrumental diagnosis of early postoperative intra-abdominal complications. The possibilities of this method are comparable to those of relaparotomy, which allows it to be used for various complications.

Laparoscopic treatment of postoperative intraperitoneal bleeding is possible with non-intensive bleeding and the condition of adequate sanitation of the abdominal cavity. For the purpose of hemostasis, various means are used (ligation, electrocoagulation, the use of hemostatic sponges and adhesive substances, tamponing).

The use of laparoscopy allowed us to avoid relaparotomy in 67 (78.8 %) of 85 patients, as well as to exclude intra-abdominal bleeding in 7 (8.2 %) patients, Francesco Corcione et al. 160 laparoscopic surgeries performed for early complications after endosurgical or endoscopic procedures were reported. Complications included bleeding (n=57). Bleeding (n=57) was managed laparoscopically in all cases. In 27 (47.4 %) patients, the source of active bleeding was not identified, abdominal lavage with drainage was performed [11].

Indications for relaparotomy were detected in 12.9 % (11/85) of our observations. The mean duration of laparoscopic surgery in the main group (33.1±22.8 min) was significantly reduced compared to the duration of relaparotomy in the control group (72.4±28.4 min). The lethal outcome in the control group was 4.5 % (2/44). No deaths were registered in the main group.

Thus, a comparative analysis of the results of treatment of patients with postoperative intra-abdominal bleeding revealed that laparoscopic intervention on the abdominal cavity has a number of advantages over traditional relaparotomy. These include, first of all, the fact that the method is not traumatic, the postoperative period proceeds easily, the pain syndrome disappears early and motor activity is restored. Secondly, the use of laparoscopic treatment leads to a decrease in the frequency of postoperative complications, mortality, as well as a reduction in the length of hospital stay.

It should be noted that the use of laparoscopy in the diagnosis and treatment of postoperative intra-abdominal bleeding does not exclude traditional surgical interventions and should be used if laparoscopic treatment is impossible or ineffective.

Conclusions

1. The use of diagnostic and therapeutic laparoscopy in case of suspected postoperative intra-abdominal bleeding avoids relaparotomy in 81.2 % of cases.
2. The use of laparoscopy for the diagnosis of postoperative intra-abdominal bleeding makes it possible to exclude bleeding in 8.2 % of cases, to justify indications for relaparotomy in 18.8 % of cases.

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