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Medical Chemistry and Its Influence on the Results of Treatment of Patients with Acute Bleeding from the Lower Compartments of the Gastrointestinal Tract

Volodymyr Sulyma
Dnipro State Medical University

Ruslan Duka
Dnipro State Medical University

Serhij Malinovskyj
Dnipro State Medical University

Kateryna Yaroshenko
Dnipro State Medical University

Ivan Bashmakov
Dnipro State Medical University

Abstract: Emergency care for patients with gastrointestinal bleeding, despite the substantial progress in drug therapy and development of endoscopic and angiographic methods of hemostasis, remains a very important issue of modern medicine. Acute bleeding from the large intestine causes up to 12-15% of all gastrointestinal bleeding. In the general population it occurs in 0.03% of individuals. There is fibrinolysis inhibitor that had been widely used for last decade. It is Tranexamic acid. Administration of Tranexamic acid is included in national guidelines and a number of international clinical protocols that describes providing medical care to patients with bleeding. To assess efficiency of treatment strategy, that includes administration of Tranexamic acid in patients with bleeding from large intestine. Primary outcomes are number of rebleeding and surgeon interventions. There were 546 inpatients, that underwent treatment in proctology department of 6th Dnipro City Hospital from 2016 to 2023. Patients were between the ages of 35-89. The number of patients under the age of 44 was 34 (6%), 45-59 – 92 patients (17%), 60-74 – 224 patients (41%), over 75 – 196 patients (36%). Gender ratio is 234 males (42,8%) and 312 females (57,2%). After examination of patients, following diseases were determined as causes of bleeding from large intestine: Crohn's disease – 5,3 %; ulcerative colitis – 12,7 %; colonic diverticulitis – 36,5 %; colorectal cancer – 20,1 %; colonic polips - 1,3 %; hemorrhoids – 24,1%. Strategy including Tranexamic acid permitted to decrease amount of rebleeding and surgical interventions, performed due to failed hemostasis, from 25,6% to 12,9%. Total mortality decreased from 11,5% to 6,4%. Indications for surgical interventions in case of bleeding from the large intestine are failed medication and endoscopic hemostasis, as well as rebleeding. Rebleeding occurs more often in those who is suffered from diverticular disease of the sigmoid colon and colonic villous adenomas.

Keywords: Tranexamic acid, Patients, Bleeding.

Introduction

Bleeding from the lower part of the gastrointestinal tract (below the ligament of Treitz) in ≈20% of patients who are hospitalized for bleeding into the gastrointestinal tract. The most frequent cause of serious bleeding is diverticula of the large intestine, less often - inflammatory bowel diseases, hemorrhoids (varicose dilated hemorrhoidal veins), neoplasms and vascular malformations, and in childhood and adolescence - intussusception (based on polyps), inflammatory bowel diseases, inflammation of Meckel's diverticulum and polyps of the small or large intestine. Bleeding can also be a consequence of coagulopathy. To assess efficiency of treatment strategy, that includes administration of tranexamic acid in patients with bleeding from large intestine. Primary outcomes are number of rebleeding and surgeon interventions.

Emergency care for patients with gastrointestinal bleeding (GI), despite the significant progress in drug therapy and the development of endoscopic and angiographic methods of hemostasis, remains a very urgent issue of modern medicine (Ivashkin, 2003; Jensen, et al., Harris, 2002). The number of hospitalized patients does not tend to decrease, and the mortality rate in gastro-intestinal tract remains high. Contributes to this: insufficient provision of endoscopic equipment and specialist endoscopists working around the clock; centers for providing assistance to patients with gastro-intestinal tract bleeding. Uncorrected concomitant pathology significantly worsens the prognosis of patients with gastro-intestinal tract bleeding.

Bleeding from the lower parts of the gastrointestinal tract is bleeding from an area that is located distal to the ligament of Treitz. It can be acute and chronic, massive and hidden. The tactics of examination and treatment of such patients are not fully developed in comparison with bleeding from the upper gastrointestinal tract. Bleeding from the lower parts of the gastrointestinal tract makes up approximately 20% of all gastrointestinal bleeding. The overall mortality rate for such bleeding is not high, 3-4%, but the mortality rate in the elderly and senile, in the presence of concomitant pathology, can reach 10% and even 25% (Bohnacker et al., 2000; Colacchio et al., 1982; Harris, 2002; Terdiman, 2001)..

Elements of the diagnostic algorithm at gastro-intestinal tract bleeding are as follows: clinical assessment of the symptom complex of acute gastro-intestinal tract bleeding, determination of deficiency volume circulated blood and degree of blood loss, severity of the condition patient, determining the location of diagnostic and treatment measures. The final step of the diagnostic algorithm was establishing a clinical diagnosis and the choice of further treatment tactics.

Patients received conservative therapy (infusion-transfusion therapy, hemostatic, symptomatic, etc.) according to methodological recommendations, if necessary endoscopic hemostasis was performed. Due to the ineffectiveness of the above-mentioned measures, the question of performing a surgical procedure was decided intervention. First of all, when the patient was admitted, bleeding from the upper parts had to be ruled out Gastrointestinal tract, because in some cases with massive bleeding there may be the release of unchanged blood with fecal masses.

Bleeding that cannot be stopped by conservative treatment methods requires emergency surgery in 10% - 55% of patients. It is especially difficult to choose the scope of such interventions for non-localized sources of hemorrhage, in which the only rational method is forced subtotal resection or colectomy, which increase the lethality to 17.2% - 22%.

The fundamental question of treatment tactics has not been finally resolved: some surgeons believe that it is more expedient to first stop the bleeding, and therefore to apply special research methods to establish a nosological diagnosis, the second tend to operate on patients at the height of hemorrhage. Insufficiently developed differentiated indications for certain types of surgical intervention for this situation.

Views on the volume of operations for cancer - the most frequent cause of bleeding - are controversial. From the point of view of some surgeons, palliative operations should be used, others insist on the possibility of radical interventions. The issue of the possibility and expediency of adjuvant chemotherapy for patients with cancer complicated by bleeding was not adequately addressed.

As a result, the significant frequency of colorectal hemorrhages and the controversial views on their diagnosis and treatment methods put in a number of important and urgent problems of emergency abdominal surgery. For this, patients were administered nasogastric probe and aspirated stomach contents. Thus, 8 patients had blood impurities in the aspirated contents. Because these patients were admitted at night, it was the endoscopist on duty at home was called, who during urgent fibrogastroduodenoscopy, he diagnosed duodenal ulcer in 6 patients, gastric ulcer in 2, which were complicated by bleeding.

Method

There were 546 inpatients, that underwent treatment in proctology department of KI "6th Dnipro City Hospital DOR" from 2016 to 2023. It is clinical base of Department of Surgery №1 and Urology. Patients were between the ages of 35-89. The number of patients under the age of 44 was 34 (6%), 45-59 – 92 patients (17%), 60-74 – 224 patients (41%), over 75 – 196 patients (36%). Gender ratio is 234 males (42,8%) and 312 females (57,2%). After examination of patients, following diseases were determined as causes of bleeding from large intestine: Crohn's disease – 5,3 %; ulcerative colitis – 12,7 %; colonic diverticula – 36,5 %; colorectal cancer – 20,1 %; colonic polips - 1,3 %; hemorrhoids – 24,1%.

The nosological structure of the causes of colon bleeding was studied. The peculiarities of clinical symptoms and the course of colon bleeding depending on their cause have been clarified. For the first time, a formalized system for determining the localization of the source of bleeding, differential diagnosis of cancer and diverticulosis complicated by hemorrhage was proposed. The optimal diagnostic and therapeutic tactics for the treatment of patients with colon bleeding have been elaborated and substantiated. For the first time, a two-stage operation was used for cancer complicated by bleeding, in which the tumor-affected segment of the intestine is removed in the first stage to stop bleeding, and in the second stage, a regional lymphadenectomy is performed, if necessary, with additional removal of a segment of the intestine, the imposition of interintestinal anastomoses. The study of long-term results of cancer treatment complicated by bleeding, with the use of modern methods of statistical analysis, was further developed.

The results of the work improve the diagnosis of the causes and localization of the sources of colon bleeding, optimize the diagnostic and treatment tactics, expand the indications for surgical treatment of colorectal cancer. After admission of patients, detailed examination was performed in order to confirm the diagnosis. It was composed of clinical assessment, laboratory and instrumental investigations (colonoscopy, barium enema, US, CT, virtual colonoscopy etc.). Patients were prescribed non-surgical treatment. It included management of blood loss and taking hemostatic agents. 78 patients had been administered different hemostatic agents (ethamsylate, vicasol) by 2016. And 468 patients had been prescribed tranexamic acid (in patients without signs of decompensated cardiovascular failure, with low risk of thromboembolic complications) in dosage 10 mg/kg (but less than 1000 mg a day) since 2017.

General clinical symptoms revealed a number of features depending on the nature of the pathology that was the cause of bleeding. In particular, loss of appetite, rapid weight loss, bloating, defecation disorders in the form of constipation with diarrhea occurred more often in cancer than in other TC diseases ($p<0.05$). Patients with cancer, as well as with benign diseases of the anal area, complained of pain more often than with other diseases. Defecation disorders and the presence of mucus in feces were significantly more common in erosive-ulcerative diseases. Pain of various localization and nature was the most frequent symptom in cancer patients (66.9%). The pain was mostly constant (46%), less often spasm-like.

The latter concerns patients who had elements of intestinal obstruction, as well as patients in whom frequent imperative defecation with bloody masses came to the fore. Pain in the hypogastrium is especially common in cancer and diverticulosis. During an objective examination, reduced nutrition, palpation of a pathological tumor in the abdomen was found more often in cancer patients than in other types of pathology ($p<0.05$). Pain during digital examination of the rectum and palpation of a pathological lesion in the rectum is most typical for benign diseases of the anal area.

The cardinal sign of colon bleeding - blood discharge from the anus - was present in all patients, in particular, liquid blood without fecal masses - in 51.7% of patients, impurities in the fecal masses of practically unchanged blood - in 29.7%, changed blood - in 18 .6%. Two patients had melena, despite the verified absence of a source of bleeding in the upper parts of the alimentary canal. The first type was noted most often in non-neoplastic processes of the anal area, the second - in polyps (50%), fresh blood with admixture of mucus - in cancer patients.

Changed blood (cherry or raspberry color) occurred with approximately the same frequency in all types of pathology, except for non-neoplastic processes of the anal area. During a digital examination of the rectum in 13 patients, fresh blood with an admixture of mucus was found more often in cancer patients (8.1%) compared to other types of pathology. Fresh blood in the ampoule was determined in 44.4% of all cancer patients, which can be associated with the intermittent nature of the hemorrhage. With polyps, an admixture of fresh blood during a digital rectal examination was found in 4.5%, and according to the anamnesis - in 50% of patients, which was a sign of more massive, but short-term hemorrhages. It is with polyps that most often in the rectum we found

normal fecal masses (22.7%). Determining the duration of actual bleeding causes significant difficulties. Bleeding can occur in several episodes; the time of the appearance of bloody secretions from the intestine is determined by the localization of the source and the intensity of the hemorrhage, the volume of the lumen and the functional characteristics of the TC. However, it is not always possible to rely on the general signs of bleeding. Taking into account these circumstances, we divided the patients into two groups, each of which was formed according to the most significant criteria that provided an opportunity to clarify this issue.

Results and Discussion

The analysis showed that the amount of operative interventions performed due to failed hemostatic treatment was 20 (25.6%) in 2016, whereas 59 patients underwent surgery from 2017 to 2022. Surgical activity in cause of ALI was 12.9%. Following surgical interventions were performed: Left hemicolectomy (diverticular bleeding) – 2 in 2016 and 5 between 2017-2022.

Right hemicolectomy (malignant tumors of the caecum) – 1 in 2016, and 4 between 2017-2022. Low anterior resection (rectal polyps) – 2 in 2016 and 5 between 2017-2022. Obstructive resection of sigmoid colon (diverticular bleeding) – 1 in 2016, 6 between 2017-2022. Laparotomy, polypectomy (polyps of sigmoid colon) – 2 in 2016, 5 between 2017-2022. Endoscopic polypectomy (colon polyps) – 4 in 2016, 9 between 2017-2022. Hartmann's operation (Crohn's disease, bleeding from the diverticula of sigmoid colon) – 3 in 2016, 9 between 2017-2022. Transanal removal of bleeding rectal polyps – 5 in 2016, 16 between 2017-2022. In addition, we analyzed the sources of bleeding, that required surgery treatment. The most frequent rebleeding was caused by diverticular disease of sigmoid colon as well as rectal and sigmoid colon polyps, that were histologically villous adenomas in 88% of cases. Outcomes assessment of suggested treatment strategy was performed by means of comparing surgical activity, postoperative and total mortality. Operative activity is 20 (25,6%) in 2016 and 59 (12,9%) between 2017-2022. Postoperative mortality is 1 (5%) in 2016 and 3 (0,7%) between 2017-2022. Total mortality is 11,5% in 2016 and 6,4% between 2017-2022.

This patient underwent endoscopic surgery hemostasis and after stabilization of the condition, the patients were transferred to the surgical department. To establish the source of bleeding except of physical examination methods with digital rectal examination, anoscopy, rectoromanoscopy, colonoscopy were used. If necessary, total colonoscopy performed 12-48 hours after the patient's admission to the hospital after stabilization of the patient's condition. Endofalk or Fortrans was used to prepare the colon for the study. In 2 patients with severe ongoing bleeding colonoscopy was performed without preparation.

Patients with mild and moderate bleeding were treated in the department of proctology, severe and extremely severe in division of reanimation. In most patients positive results were achieved using conservative therapy. But in 4 patients with non-specific ulcerative colitis it was not possible to achieve stable hemostasis, therefore 2 patients with total damage of the large intestine, a total colectomy was performed, in another 2nd patient to disconnect the affected part of the large intestine, taking into account the severe condition, ileostomies were removed. One is sick died after total colectomy. Bleeding from the lower parts of the gastrointestinal tract remains an important problem, help for such patients should be timely with the use of modern medical technologies, making and implementing quick decisions regarding diagnostic and treatment tactics. Thus, during the period of usage the suggested treatment strategy, the number of rebleeding and surgical interventions, associated with rebleeding, decreased from 25.6% to 12.9%. All-cause mortality rate decreased from 11.5% to 6.4%. There are 4 types of bleeding: 1) the bleeding stopped even before going to the clinic or on the first day of the hospital stay; 2) continued for 2-4 days, then stopped and did not recur; 3) stopped during the first day of stay in the hospital, then recovered; 4) the bleeding did not stop.

The first two types are qualified as stable, the third and fourth - as unstable hemostasis (considering continued bleeding as an extreme variant of unstable hemostasis). Unstable hemostasis prompts the use of special measures to stop bleeding, including surgery, and greatly complicates the full diagnosis of the nature and localization of the source of bleeding. Unstable hemostasis, noted in 12.7% of all patients, is most characteristic of colorectal cancer ($p<0.05$). "Bleeding in the anamnesis" was considered a hemorrhage that was separated from the actual one by a period of time of at least one week of normal defecation. 62 (20.7%) patients had a history of bleeding, especially often in patients with diverticulosis (41.7% of this pathology) and cancer (23.4%). These data, together with the course of bleeding in the hospital and catamnesis, give reason to believe that cancer and diverticulosis are the most prone to recurrence of bleeding. In patients with cancer, recurrences of bleeding occur within a relatively short period of time (usually half a year), in patients with diverticulosis - a much longer period of time *(Colacchio T.A).*

The source of bleeding in 137 (45.7%) patients was located in the rectum and anus; in 100 (33.3%) patients - in the left, in 36 (12%) - in the right sections of the colon. In 27 (9%) patients, the pathological process was located in several places or on a significant length of the intestine, which made it difficult to determine the localization of the source of bleeding (polyposis - in 1, diverticulosis - in 6, erosive-ulcerative processes - in 20 patients). On the basis of the identified significant differences ($p<0.05$) in the characteristics of hemorrhagic syndrome, a diagnostic index of localization of the source of hemorrhage was developed. The main ones are the age of the patients, the nature of discharge from the rectum, systolic blood pressure, the degree of anemia, the localization of pain, the volume of necessary blood transfusions. The sensitivity of the index was 82.3%, and the specificity was 78.9%. It was established that the severity of blood loss is dominated by hemorrhages from the right half of the colon.

Among various types of pathology, the most numerous group (124 out of 300 - 41.3%) is colon cancer, the share of which during the existence of the gastrointestinal bleeding center gradually increased from 32.8% to 53.5% ($p<0.05$). The most frequent cause of tumor bleeding was cancer of the rectum (50.0%) and sigmoid colon (19.3%). A significant part of patients (42.6%) had stage 4 of the disease, especially often patients with rectal cancer (57.6%). Contrary to the previously widespread opinion, bleeding also occurs in the early stages of the disease: the first and second stages of the tumor were found in 7 patients (6% of all cancer patients).

Reports in the literature that bleeding is often the first symptom of colorectal cancer requires clarification - it refers only to the first symptom that prompted patients to seek medical help (Ivashkin, 2003). A system of formalized differential diagnosis of colon cancer has been developed. For this purpose, symptoms were selected from the clinical characteristics of diseases complicated by bleeding, the frequency of which in cancer patients shows a statistically significant difference ($p<0.05$) in comparison with other types of pathology. The sum of points greater than 0 corresponds to the high significance of the diagnosis of cancer, less than 0 to the high significance of another cause of hemorrhage. The sensitivity of the identified diagnostic criteria is 58.9%, the specificity is 89.2%.

The given information makes it possible to establish a diagnosis of colon cancer with a high probability, but not with a significance that could be used as a basis for treatment tactics. Final verification belongs to direct diagnostic methods. The exception was 7 patients, in whom special research methods could not be applied, because ongoing hemorrhage required urgent surgical intervention. Non-neoplastic diseases of the anal area (57 patients - 19.0%) include hemorrhoids (54) and anal fissures (3). Patients of this group are the youngest ($p<0.05$), (average age 48,014.2 years), the majority are men (68.4%) ($p<0.05$). A typical symptom was pain in the area of the anal sphincter (56.1%), which arose or was aggravated by the act of defecation, tenesmus (52.6%).

Hemorrhagic syndrome was manifested by the release of fresh liquid blood from the anus, which in most patients (71.9%) was provoked by defecation. Rectal contents on digital examination also showed fresh liquid (42.1%) and admixture of unchanged blood (24.6%) in feces. The main methods of establishing a diagnosis in all patients were: examination of the anal area, digital examination and rectoromanoscopy. The group of erosive-ulcerative diseases includes erosive processes and non-specific ulcerative colitis. The diagnosis was established by the endoscopic method of research, if necessary with the addition of irrigoscopy, inspection ultrasonography of the abdomen and diagnostic laparoscopy.

Diverticulosis was diagnosed in 36 patients. The average age of the patients was 67.2 ± 13.9 years and was the highest. Hemorrhage was a complication of both diverticulosis (23 patients) and diverticulitis (13), which was distinguished by the presence of a pain syndrome before the appearance of bleeding; inflammatory changes in peripheral blood, the presence of an infiltrate during palpation of the abdomen, a typical endoscopic picture - hyperemia around the eyes of diverticula and contact bleeding during instrumental palpation of the inflamed mucous membrane. Diverticulosis is characterized by particularly great difficulties in diagnosis during bleeding, more pronounced hemorrhagic syndrome, compared to other non-neoplastic diseases (often recurrent course, massive blood loss) (Jensen et al., 2000). A number of symptoms (age, local abdominal pain, presence of bleeding in the anamnesis) were identified, which statistically significantly differed from other types of pathology in terms of their frequency of presence or intensity. A differential diagnostic index of diverticulosis was developed based on clinical symptoms; sensitivity of the method is 83.3%, specificity - 65%. However, the diagnosis is finally verified by special research methods, mainly endoscopic or X-ray *(Bohnacker et al.., 2000)*.

Polyps (22 patients - 7.3%) were characterized by poor general clinical symptoms, but a pronounced hemorrhagic syndrome, which in sum increases diagnostic difficulties and prompts active treatment. Endoscopic research methods are of primary importance in diagnosis. Other diseases are diagnosed endoscopically, by

intraoperative revision; hematological diseases were verified by examination of peripheral blood, bone marrow punctate.

The goals of treatment are: 1) stopping bleeding; 2) correction of homeostasis; 3) treatment of the disease that caused the bleeding; 4) treatment of accompanying diseases, which often worsen and decompensate in patients with bleeding. The most important vital task is to stop the bleeding. In the majority of patients, the most appropriate diagnostic and treatment program, according to which conservative methods first stop the bleeding, then special research methods are used, and based on the established diagnosis, the question of the nature of treatment - conservative, endoscopic or surgical - is decided.

The expediency of such tactics is based on the relatively benign course of colon bleeding, in most patients it is moderate and stops after the use of conservative hemostatic therapy. Hemorrhage in the lumen of the colon sharply complicates the resolution of diagnostic issues, primarily the localization and nature of the source of bleeding. Operations at the height of bleeding are associated with high mortality.

Such a tactic, however, is not always possible. Changes are made to this scheme if it is necessary to perform urgent surgical interventions, the indications for which are: 1) bleeding that does not stop, despite the use of all possible methods of hemostasis; 2) high probability of recurrence of bleeding due to unstable hemostasis; 3) combination of hemorrhage with other complications that require surgical treatment (perforation, purulent process, etc.).

The treatment of our patients began with an assessment of the amount of blood loss and its rapid and adequate supplementation in cases of necessity. The main indirect criterion for the massiveness of bleeding was the level of systolic and diastolic blood pressure at the time of bleeding, pulse characteristics, globular indicators (hemoglobin level, number of erythrocytes, hematocrit) *(Terdiman JP., 2002).*

Circulating blood volume was restored by infusion of crystalloid (lactosol, Ringer-Locke solution, 5% glucose solution, physiological solution, etc.) and colloidal (fresh-frozen plasma, albumin solution) solutions. Central venous pressure above 50 mmHg, systolic arterial pressure - above 100 mmHg, diuresis - more than 30 - 40 ml/h were criteria for recovery of Circulating blood volume.

General hemostatic therapy was used - etamsylate, 5% aminocaproic acid, fresh frozen plasma, 5% - 20% p-n albumin. The need for transfusion of blood products arose in 135 (45.0%) patients with colon bleeding, who were transfused with an average of 929.5 627.8 (ranging from 150 to 3350) ml of erythrocyte mass. Patients with cancer, hematological diseases, Randu-Osler-Weber disease and angiodysplasia required the largest number of transfusions.

We prescribed broad-spectrum antibiotics in combination with metronidazole to patients with massive blood loss, leukocytosis, and pain syndrome for therapeutic and preventive purposes. In the treatment of bleeding caused by inflammatory diseases, sulfasalazine, salofalk or their analogues were used. A theoretical generalization and a new solution to the scientific problem are given, which is manifested in the creation of formalized systems for determining the localization of the source of colorectal hemorrhage, diagnosis of cancer and diverticulosis of colon, development of optimal diagnostic and treatment tactics in patients with colonic bleeding (Harris, 2002).

- Colonic bleedings account for 8.7% of all hemorrhages in the lumen of the gastrointestinal tract. The most common causes are: cancer (41.3% of all colon), non-neoplastic diseases of the anal area (19.0%), erosive-ulcer diseases (14.3%), diverticulosis (12.0%), colon polyps (7.3 %).
- Hemorrhagic syndrome is characterized by a number of differences in various diseases. Bleeding occurs with the greatest blood loss in diverticulosis cancer, polyps, most prone to recurrence - in cancer and diverticulosis.
- The optimal diagnostic and therapeutic tactic in most patients consists in stopping bleeding with conservative measures, hence in diagnosing the cause of bleeding and determining the final method of treatment.
- In determining the indications for surgical treatment, the purpose of the operation, the essence of the pathology, the phase of the hemorrhagic process and the state of compensation for homeostasis disturbances are taken into account. It is appropriate to distinguish between emergency operations, with the aim of stopping bleeding, preventive - to prevent its recurrence in case of unstable hemostasis, planned - after restitution of the main indicators of homeostasis for the treatment of the disease that was the cause of bleeding.
- Diagnosis is based on direct research methods (mainly fibrocolonoscopy). Proposed and developed formalized systems for determining the location of the source of bleeding (sensitivity - 82.3%, specificity - 78.9%), diagnosis of colorectal cancer (sensitivity - 58.9%, specificity - 89.2%) and diverticulosis (sensitivity - 83, 3%,

specificity - 65%) can be considered as a basis for the final choice of treatment tactics only if urgent surgery is necessary in patients.
- Bleeding occurs in all stages of cancer. In 52.4% of cancer patients, bleeding is the first symptom that prompts patients to seek medical help.
- To prevent recurrence of bleeding, it is advisable to eliminate the source of bleeding from the alimentary canal. During surgical interventions for cancer of the fourth stage, bleeding is a significant indication for performing palliative operations, which corresponds to the main requirement of surgery - to stop bleeding.
- In cases in which, for one reason or another, full-fledged oncological and surgical treatment is impossible, the operation is carried out in two stages. The first stage most often consists in the removal of the segment of the TC affected by the tumor, which ensures hemostasis, the second - in regional lymphadenectomy, if necessary - additional removal of certain segments of the intestine, imposition of an interintestinal anastomosis. In most patients who underwent radical surgery for cancer, bleeding is not a contraindication to the use of adjuvant chemotherapy.
- Patients with polyps and non-cancerous diseases of the anal area are subject to planned operations among patients with other diseases that are complicated by colon bleeding. Patients with diverticulosis and erosive-ulcer diseases are indicated for emergency surgery in cases of continued bleeding when conservative therapy is ineffective.

Conclusion

Formalized systems for determining the localization of the source of colonic bleeding, diagnosing colorectal cancer and diverticulosis are proposed. The optimal diagnostic and therapeutic tactics for patients with colorectal hemorrhage and a new type of staged radical surgical interventions for colon cancer complicated by bleeding have been developed. The frequency of complications and postoperative mortality were evaluated. The long-term results of treatment were studied. Peculiarities of the course of colorectal bleeding are studied. Hemorrhagic syndrome is characterized by a number of differences in various diseases. Hemorrhages induce the most significant blood loss in cancer, diverticulosis and polyposis, they also are highly prone to relapses in the first two conditions.

Complaints, histories, clinical symptomatology as well as methods of diagnostics and treatment are analyzed. Direct methods of investigation (fibrocolonoscopy) constituted the basis of diagnostics. Formalized systems, designed for localizing the source of colorectal bleeding (sensitivity - 82,3%; specificity - 78,9%) as well as for diagnostics of colorectal cancer (sensitivity - 58,9%; specificity - 89,2%) and diverticulosis (sensitivity - 83,3%; specificity - 65%), are proposed and elaborated. The diagnostic systems serve mainly as approximative means; the may only be considered as a basis for the leading treatment option to be chosen, when an urgent surgical intervention in patients with colonic bleeding is required. An optimal diagnostic and treatment tactics in the majority of patients is to ensure the bleeding cessation using conservative approaches, followed by estimation of bleeding causes and further by development of the final treatment strategy. While evaluating indications for surgical intervention, one has to consider the goal of operation, nature of the disorder, phase of hemorrhagic process and degree of compensation of homeostatic disturbances. It is advisable to distinguish urgent operations to stop the bleeding, prophylactic ones aimed at prevention of its relapses in unstable hemostasis, and planned surgery for underlying disease after restitution of basic hemostatic parameters.

A new type of two-stage radical operations in the cases of colonic cancer, complicated with hemorrhage, is proposed. If no appropriate management from both oncologic and surgical viewpoints can be applied, the operation is divided into two stages. As a rule, the first stage is to remove a tumorously affected colonic segment and to restore hemostasis, ehile the second one being regionary lymphadenectomy with removal of colonic segments, wherever necessary, and subsequent application of inter-intestinal anastomosis.

Recommendations

Application of the treatment strategy including tranexamic acid permitted to decrease amount of rebleeding and surgical interventions, performed due to failed hemostasis, from 25,6% to 12,9%. Total mortality decreased from 11,5% to 6,4%. Indications for surgical interventions in case of bleeding from the large intestine are failed medication and endoscopic hemostasis, as well as rebleeding. Rebleeding occurs more often in those who is suffered from diverticular disease of the sigmoid colon and colonic villous adenomas. In the majority of patients undergoing radical surgery for cancer, the bleeding is not a contraindication for administration of adjuvant

chemotherapy. Among patients with other pathologies, complicated with colonic hemorrhages, those suffering from polyposis and non-neoplastic diseases of anal area are eligible for planned surgery. In the cases of continuing bleeding in diverticulosis and erosively-ulcerative disorders an urgent operation is indicated unless conservative therapy is ineffective. The incidences of complications and postoperative mortality are assessed. Long-term treatment results are also investigated. In the future, the application of the proposed method of diagnosis and treatment patients with colon bleeding, can be the basis of a new direction of instrumental diagnostics in surgery and oncology.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

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Author Information

Volodymyr Sulyma
Dnipro State Medical University
Vernadskyj Street, 9, Dnipro, 49000, Ukraine
Contact e-mail: *Volodyasulyma2@gmail.com*

Ruslan Duka
Dnipro State Medical University
Vernadskyj Street, 9, Dnipro, 49000, Ukraine

Serhij Malinovskyj
Dnipro State Medical University
Vernadskyj Street, 9, Dnipro, 49000, Ukraine

Kateryna Yaroshenko
Dnipro State Medical University
Vernadskyj Street, 9, Dnipro, 49000, Ukraine

Ivan Bashmakov
Dnipro State Medical University
Vernadskyj Street, 9, Dnipro, 49000, Ukraine

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