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Research Article

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Gastrointestinal Bleeding Associated with Anticoagulant and Antiplatelet Therapy

A.N. Severtsev [1], ***V.D. Anosov*** [1, 2], ***S.A. Domrachev*** [3], ***S.V. Ovchinnikov*** [2], ***L.S. Rogozhina*** [2], ***N.O. Solovyev*** [3] ✉, ***I.V. Yurchenko*** [2]

Department of high-tech surgery and surgical endoscopy
[1] N.I. Pirogov Russian National Research Medical University
Ostrovitianov Str. 1, Moscow, Russian Federation 117997
[2] O.M. Filatov City Clinical Hospital No. 15
Veshnyakovskaya Str. 23, Moscow, Russian Federation 111539
[3] A.S. Loginov Moscow Clinical Scientific and Practical Center
Entuziastov Highway 86, Moscow, Russian Federation 111123

✉ **Contacts:** Nikita O. Solovyev, Surgeon, Department of High-Tech Surgery and Surgical Endoscopy, A.S. Loginov Moscow Regional Clinical Scientific Center. Email: niks97@list.ru

INTRODUCTION Treatment of gastrointestinal bleeding in patients receiving

anticoagulant and antiplatelet therapy is an extremely complex and urgent problem. The risks of recurrent bleeding in such patients are extremely high, while the effectiveness of standard methods of treating gastrointestinal bleeding in this category of patients is lower, compared to the general population. The above served as a prerequisite for this study.

MATERIAL AND METHODS In the period from 2020 to 2023, 362 patients receiving antiplatelet or anticoagulant therapy were treated for gastrointestinal bleeding at the O.I. Filatov City Clinical Hospital. All patients underwent endoscopic examination of the gastrointestinal tract, with primary endoscopic hemostasis required in 126 patients (34.8%). Endovascular embolization of the vessel — the source of bleeding. Risk factors for death, need for surgical intervention and recurrence of bleeding were analyzed. The sensitivity and specificity of the Rockall and Glasgow–Blatchford scales for assessing the risk of recurrence of bleeding and the need for surgical intervention in this category of patients were studied.

RESULTS Anticoagulant therapy was statistically significantly associated with an increased risk of death. Among the risk factors for death, COVID-19 infection, age over 75 years, and arterial hypertension were statistically significant. Endovascular hemostasis demonstrated the greatest effectiveness embolization, the frequency of recurrent bleeding in this intervention was 5.7%, versus 32.5% in endoscopic interventions. The prognostic significance of the Rockall and Glasgow–Blatchford scales according to the results of our study was insufficient.

CONCLUSION The results of the study are consistent with the data of the world literature. It is necessary to take into account the high efficiency of endovascular embolization in this category of patients when choosing a hemostasis method. Risk factors associated with a fatal outcome also do not contradict the generally accepted concept. At the same time, the feasibility and objectives of using current prognostic scales in such patients require further study.

Patients over 75 years of age receiving anticoagulant therapy, as well as patients with COVID-19, have a lower risk of death, which must be taken into account when treating such patients ($p<0.01$).

The appropriateness of using the Rockall and Glasgow–Blatchford prognostic scales in this category of patients is low, as evidenced by the low area under the curve (AUC) for the Rockall scale (0.6) and for the Glasgow–Blatchford scale (0.48).

Keywords: gastrointestinal bleeding, hemostasis, vascular embolization

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Affiliations

Aleksey N. Severtsev	Doctor of Medical Sciences, Professor, Acting Head, Department of Hospital Surgery No. 1, N.I. Pirogov Russian National Research Medical University; https://orcid.org/0009-0002-3847-8387, sev_alex@mail.ru; 20%, concept development, text correction
Victor D. Anosov	Candidate of Medical Sciences, Deputy Chief Physician for Surgical Care, O.M. Filatov City Clinical Hospital No. 15; https://orcid.org/0000-0002-8486-7159, avsurg@mail.ru; 15%, concept development, text correction

Sergey A. Domrachev	Doctor of Medical Sciences, Leading Researcher, A.S. Loginov Moscow Scientific Center; https://orcid.org/0000-0001-6759-2491, domra53@list.ru; 15%, concept development, text correction
Sergey V. Ovchinnikov	Surgeon, O.M. Filatov City Clinical Hospital No. 15; https://orcid.org/0009-0006-0265-4659, servio@mail.ru; 12.5%, statistical data processing, text writing
Ludmila S. Rogozhina	Surgeon, O.M. Filatov City Clinical Hospital No. 15; https://orcid.org/0000-0002-3983-7890, rogozhinals@mail.ru; 12.5%, statistical data processing, text writing
Nikita O. Solovyev	Surgeon, Department of High-Tech Surgery and Surgical Endoscopy, A.S. Loginov Moscow Scientific Center; https://orcid.org/0000-0002-1295-8035, niks97@list.ru; 12.5%, statistical data processing, text writing
Irina V. Yurchenko	Cardiologist, O.M. Filatov City Clinical Hospital No. 15; https://orcid.org/0009-0007-8457-6347, irinayurchenko28@gmail.ru; 12.5%, statistical data processing, text writing

AC – anticoagulants
AP – antiplatelet agents
GIB – gastrointestinal bleeding

INTRODUCTION

Gastrointestinal bleeding (GIB) is one of the most common emergency surgical pathologies [1]. Currently, there are many effective methods for treating GIB, the leading role among which is played by minimally invasive methods, such as endoscopic hemostasis and endovascular interventions. Due to a wide range of possibilities for achieving hemostasis, it is possible to achieve good results in the treatment of GIB in emergency surgical hospitals. However, in severe cases, the mortality rate in such patients can reach 20% [1]. In the structure of GIB, there are patients whose treatment is an extremely difficult task. In particular, patients receiving continuous anticoagulant (AC) and antiplatelet (AP) therapy have a significantly higher risk of developing GIB and recurrent bleeding [1, 2]. Moreover, the effectiveness of even modern minimally invasive treatment methods in such patients is lower, and the risk of death is naturally higher - in comparison with the general population [2]. The fight against GI tract infections in this case is complicated by the fact that AC or AP therapy is usually required for severe cardiovascular disorders, which in turn increases the risk of complications and death [3].

Today, there is an active discussion regarding the tactics of treatment and prevention of GI bleeding in patients receiving AC and AP therapy [4]. In the world literature, there are studies with high statistical significance - systematic reviews and meta-analyses on this topic [2, 5]. However, such works to a greater extent highlight problems and expose unresolved issues than offer their solutions.

All of the above served as a prerequisite for our study. **The aim** of this work is to improve the treatment results of patients with GI bleeding who receive AC and AP therapy. **The objectives of the study:** analysis of the treatment results of these patients in an emergency surgical hospital, evaluation of the effectiveness of modern hemostasis methods, determination of risk factors for death and recurrent bleeding, and evaluation of the sensitivity and specificity of the *Rockall* and *Glasgow–Blatchford scales* in this cohort of patients.

MATERIAL AND METHODS

In the period from 2020 to 2023, 362 patients who received AP or AC therapy were treated for gastrointestinal bleeding at the Filatov City Clinical Hospital. Of these, 176 were men (48.6%) and 186 women (51.4%). The median age was 75 years (32–102). All patients underwent endoscopic examination of the gastrointestinal tract, with primary endoscopic hemostasis required in 126 patients (34.8%). In addition, 35 patients (9.6%) underwent endovascular embolization of the bleeding source. The remaining 216 patients (65.2%) received conservative therapy without any invasive surgical interventions. The median ASA scale was score 3. Mortality in the overall group was 35%. Detailed demographic characteristics and data on surgical interventions are presented in Table. 1.

A retrospective cohort study was conducted, patients were divided into subgroups according to the therapy received (AP, AC, AP + AC) and treatment methods. Multivariate analysis was performed, risk factors for death, the need for surgical intervention and recurrent bleeding were analyzed. The sensitivity and specificity of the *Rockall* and *Glasgow-Blatchford scales for assessing the risk of recurrent bleeding and the need for surgical intervention in this category of patients were studied. Statistical data processing was performed using IBM SPSS ®* (*Statistical Package for the Social Sciences*) *Statistics* software *V* 22.0. The statistical significance of quantitative and qualitative indicators was calculated using the Pearson χ^2 criterion , Student's coefficient and Fisher's exact test. The sensitivity and specificity of the *Rockall* and *Glasgow–Blatchford scales* were assessed by constructing the *ROC* curve (*Receiver Operator Characteristic*), then the numerical indicator of the "area under the curve" (AUC) was determined *for* each *scale*.

Table 1

Demographic characteristics and surgical intervention data

Indicators	AP (*n*=134)	AC (*n*=179)	AP+AC (*n*=49)	General group (*n*=362)	*p*
ASA, median	3	3	3	3	N.S.
Gender, n (%): Men Women	 69 (51.4) 65 (48.6),	 78 (43.5) 101 (56.5)	 29 (59) 20 (41)	 176 (48.6) 186 (51.4)	N.S.
Age, median	71	77	73	75	N.S.
Source of housing and communal services, n (%): Esophagus Stomach The duodenum Small intestine Colon	 20 (14.9) 65 (48.5) 53 (39.5) 1 (0.7) 20 (14.9)	 23 (12.8) 88 (49.1) 59 (32.9) 5 (2.7) 30 (16.7)	 3 (6) 25 (51) 14 (28.5) – 11 (22)	 46 (12.7) 178 (49.1) 126 (34.8) 6 (1.6) 61 (16.8)	N.S.
Primary endoscopic hemostasis, n (%)	50 (37.3)	65 (36.3)	11 (22.4)	126 (34.8)	N.S.
Repeated endoscopic hemostasis, n (%)	16 (32)	18 (27.6)	7 (63.6)	41 (32.5)	N.S.
Endovascular embolization, n (%)	14 (10.4)	14 (7.8)	7 (14.2)	35 (9.6)	N.S.
Mortality, n (%)	33(24.6)	71 (39.6)	24 (48.9)	128 (35.3)	<0.01

Notes: AP - antiplatelet agents; AC - anticoagulants; GCI - gastrointestinal bleeding; *NS - not significant* ; *p* — statistical significance

RESULTS

In most cases, the bleeding source was localized in the stomach and duodenum (Table 1). Mortality in the overall group (n = 362) was 35% (n = 128), while taking AC, age over 75 years, and *COVID* -19 infection were statistically significant predictors of the risk of death ($p < 0.01$). Of the 362 patients admitted with a clinical and instrumental picture of gastrointestinal bleed, the majority - 216 patients - received conservative therapy. Primary endoscopic hemostasis was performed in 126 patients. In most cases, endoscopic intervention consisted of injecting the bleeding area with epinephrine and prescribing

argon plasma coagulation, either alone or in combination. Recurrent bleeding after primary endoscopic hemostasis was observed in 32.5% of patients (n = 41). Mortality in the group of patients after endoscopic interventions was 29.3% (n = 37), and in the conservative therapy group, death was recorded in 37.9% of cases (n = 82). However, these mortality rates did not have statistically significant differences between the groups (p > 0.05).

It is obvious that AC and AP therapy significantly increase the risk of GI bleeding and further recurrence of bleeding; in addition, as a result of statistical processing of the data, it was established that arterial hypertension in this category of patients is a reliable predisposing factor for recurrence of bleeding (p <0.01), both in ongoing and existing bleeding.

Endovascular embolization of the bleeding source vessel was performed in 35 patients. In 11 cases, the surgical intervention was primary, and in 24 cases, embolization was performed after previous endoscopic hemostasis. Recurrent bleeding developed in only 5.7% of cases (n = 2), thus the frequency of recurrent bleeding after endovascular hemostasis was statistically significantly lower compared to the results of endoscopic treatment methods (p < 0.01). When comparing the treatment results of patients in the AP, AC and AC + AP groups, it was found that the use of anticoagulants was statistically significantly associated with a higher mortality rate (p < 0.01).

To assess the risk of recurrent bleeding and the need for surgical intervention to achieve hemostasis, the *Rockall* and *Glasgow–Blatchford scales were used* . When analyzing *the ROC curves for both scales, low AUC* values were obtained (*Rockall* — 0.6 and *Glasgow–Blatchford* — 0.48) for predicting the risk of recurrent GI bleeding in this category of patients (Fig. 1, 2). This indicates a low prognostic value of these scales for assessing the risk of recurrent GI bleeding.

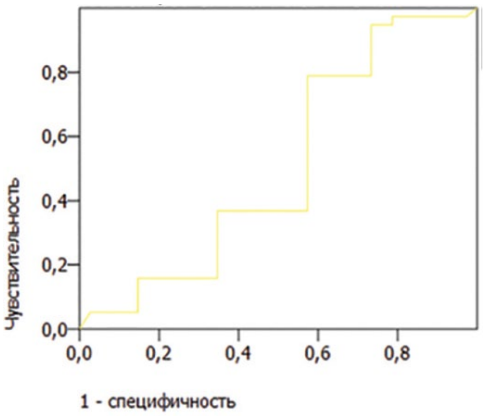

Fig. 1. ROC curve Rockall scale. Risk of recurrent gastrointestinal bleeding

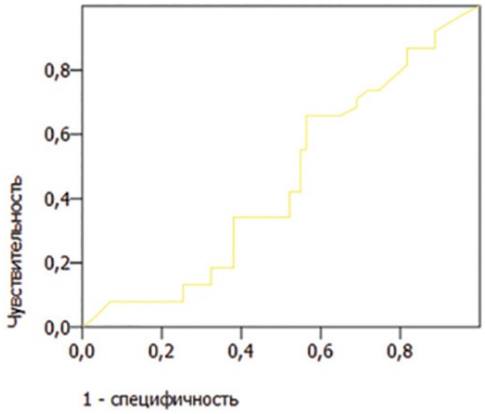

Fig. 2. ROC curve of the Glasgow-Blatchford scale. Risk of recurrent gastrointestinal bleeding

Further analysis examined the prognostic value of these scales in assessing the risk of needing surgical intervention to achieve hemostasis. The *AUC* for the *Rockall scale* was 0.75 (Fig. 3), indicating sufficient prognostic significance of this scale. For the *Glasgow–Blatchford scale,* the *AUC* was low and was 0.57 (Fig. 4).

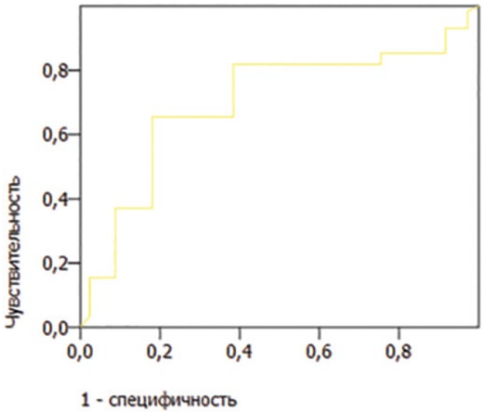

Fig. 3. ROC curve Rockall scale. Need for intervention

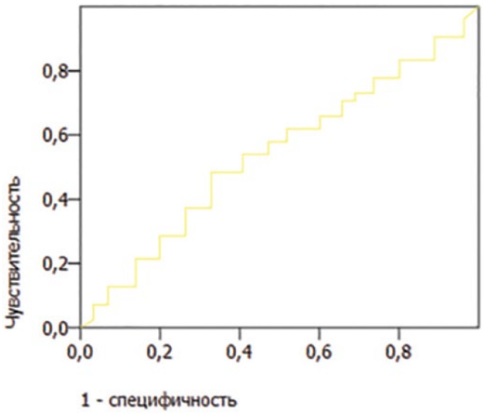

Fig. 4. ROC curve Glasgow–Blatchford scale. Need for intervention

Thus, the prognostic significance of the *Rockall* and *Glasgow-Blatchford scales* in this category of patients was ambiguous. Based on the obtained results, in patients with GI bleeding who receive AP and AC therapy, the *Rockall scale can be recommended* for assessing the risk of the need for surgical intervention for hemostasis, while the main functions of these scales are ineffective in this category of patients.

DISCUSSION

The proportion of patients receiving antithrombotic therapy (AP and AC) is constantly growing worldwide [6]. Antithrombotic therapy includes a wide range of drugs: acetylsalicylic acid, warfarin, clopidogrel, rivaroxaban and various low molecular weight heparins [7]. Moreover, more than 1% of patients experience such a complication as gastrointestinal tract bleeding [7]. A large number of studies have been devoted to this topic [8], the authors of which agree: antithrombotic, and, in particular, AC therapy is associated with an increased risk of gastrointestinal tract bleeding, and the risk of death with such a complication in these patients is higher [2–4, 8,9]. The results of our work are consistent with the literature data: AC intake wasstatistically significantly associated with higher mortality. To date, there are no standardized algorithms for the treatment of gastrointestinal tract bleeding in this category of patients, and, as a rule, surgical tactics do not differ from those in the absence of AC and AP therapy [4]. According to the results of our study, endovascular embolization demonstrated high efficiency of hemostasis, since the recurrence rate after this procedure was 5.7%. The efficiency of this surgical intervention in case of high risk of recurrence of gastrointestinal tract bleeding, according to the literature, exceeds 90% [10–12]. Endovascular embolization reduces the risk of repeated interventions and the incidence of death in patients with high risk of recurrence of gastrointestinal tract bleeding [13, 14]. This intervention is also increasingly used for preventive purposes [13, 14]. Thus, based on the literature data and the results of our study, we can conclude that transarterial embolization is an effective method of hemostasis in case of gastrointestinal tract bleeding during AP and AC therapy. The use of this method for the prevention of gastrointestinal tract bleeding in this group of patients requires further study.

Reliable stratification of the risk of recurrence of GI bleeding while taking AC and AP is of no small importance. According to the results of our study, the most relevant *Rockall* and *Glasgow–Blatchford scales* do not have sufficient sensitivity and specificity in this category of patients. There is no consensus on the choice of a reliable scale for stratifying the risk of recurrence of GI bleeding for these patients.

Treatment of GI bleeding in patients receiving antithrombotic therapy is a multifaceted and multidisciplinary task. Our work studies the problem, first of all, from a surgical point of view; similar works are rare in the literature; on the contrary, most publications have a therapeutic and cardiological focus [2–4, 8–9]. In this regard, some provisions of our work do not take into account the therapeutic approach to this problem. Nevertheless, this work has a sufficient sample size, we used relevant methods of statistical data processing, the study is based on the principles of evidence-based medicine. Further multicenter multidisciplinary studies are required to improve the treatment results of this category of patients, determine the most effective methods of combating GI bleeding and standardize treatment tactics.

CONCLUSION

COVID -19 infection and age over 75 years were also statistically significant risk factors for death . Arterial hypertension was a statistically significant predictor of recurrent bleeding regardless of the hemostasis method.

The best treatment results in this category of patients were achieved through endovascular embolization; the frequency of recurrent bleeding with this intervention was 5.7, versus 32.5% (p <0.01, statistically significant).

Rockall and *Glasgow–Blatchford* scales for assessing the risk of recurrent bleeding should be extrapolated with caution to this category of patients; their prognostic significance according to the results of our study was insufficient, while the *Rockall scale,* in a retrospective analysis, had a high prognostic value in relation to assessing the risk of the need for surgical intervention to achieve hemostasis.

FINDING

1. The greatest efficiency and the greatest potential for improving the results of treatment of gastrointestinal bleeding in patients receiving anticoagulant and antiplatelet therapy is endovascular embolization, which allows a statistically significant reduction in the frequency of recurrent bleeding compared with that with endoscopic hemostasis (p <0.01).

2. Patients over 75 years of age receiving anticoagulant therapy, as well as patients with *COVID* -19, have a lower risk of death (p <0.01), which must be taken into account when treating such patients.

3. The appropriateness of using the *Rockall* and *Glasgow–Blatchford prognostic scales* in this category of patients is low, as evidenced by the low area under the curve (*AUC) values* for the *Rockall scale* – 0.6 and for the *Glasgow–Blatchford scale* – 0.48.

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