Annals of Biomedical and Clinical Research

Original article

ABCR Vol 2; No 1; 2023;1-7

An assessment of the age, blood tests, and comorbidities (ABC) score for gastrointestinal bleeding in patients receiving anticoagulant/antithrombotic therapy

Antonio Bencun, Maja Karin

School of Medicine, University of Mostar, Bosnia and Herzegovina; Department of Internal Medicine, University Clinical Hospital Mostar

ABSTRACT

Background: The main aim of this study was to examine the effect of anticoagulant and/or antithrombic drug administration on gastrointestinal (GI) bleeding severity and the mortality rate.
Methods: This study included 217 patients hospitalized at the Clinic of Internal Medicine at the University Clinical Hospital Mostar during the period from January 1, 2019, to December 31, 2021, with a diagnosis of manifest GI bleeding and anemia of unknown cause where an endoscopy revealed bleeding in the GI system. Data were collected from the hospital information system based on age, blood tests, and comorbidities (ABC) score parameters and were scored. The patients were divided into two groups, with one undergoing anticoagulant and/or antithrombotic therapy and the other not receiving these therapies, and the ABC score values were compared.
Main findings: The total share of patients receiving anticoagulant and/or antithrombotic therapy was only 25.93%, which is statistically significantly less than the share of patients without treatment. Disorders of consciousness were statistically significantly more common in patients undergoing anticoagulant and/or antithrombotic therapy than in those without treatment (p=0.001). The subjects with therapy also achieved a significantly higher ABC sum than those without (p=0.001), while there was no statistically significant difference in the mortality rate between the two groups (p=0.335).
Principal conclusions: Patients using anticoagulant and/or antithrombic therapy achieved a statistically significantly higher ABC score sum compared to those not receiving such therapy. However, no significant differences in mortality rates were found between the two groups of patients.

Key words: anticoagulant therapy; antithrombic therapy; ABC score; gastrointestinal bleeding

Article processing history:
Received December 4, 2022
Revised February 15, 2023
Accepted April 23, 2023

ORCID IDs of the authors:
M.K. 0000-0002-2658-1689
A.B. 0009-0009-3476-2525

Corresponding author:
Antonio Bencun,
School of Medicine, University of Mostar, Bijeli brijeg bb, 88000 Mostar, Bosnia and Herzegovina
E–mail: antonio.bencun@mef.sum.ba

Cite this article as: Bencun A, Karin M. An assessment of the age, blood tests, and comorbidities (ABC) score for gastrointestinal bleeding in patients receiving anticoagulant/antithrombotic therapy. Annals of Biomedical and Clinical Research. 2023;2:1-7.

https://doi.org/10.47960/2744-2470.2023.1.2.1
Copyright © School of Medicine, University of Mostar 2023

INTRODUCTION

Despite the improvement of knowledge about the causes and treatment of gastrointestinal (GI) bleeding with the use of sophisticated endoscopic devices, the numbers of hospitalizations and mortality rates have not decreased in the last 20 years in the developed countries of the Western world. The possible reasons for this include the population aging, as well as the increased prevalence of gastroesophageal reflux disease (GERD) and obesity, antibiotic resistance to *Helicobacter pylori* (HP), growing usage of antithrombotic and/or anticoagulant drugs, and excessive utilization of non-steroidal antirheumatic drugs (NSAIDs) (1). Several classifications have been developed to predict the outcome of patients with upper and lower GI bleeding.

Recent studies have shown that the results of existing classifications that predict mortality are extremely poor. Because of this, the UK National Confidential Inquiry into Patient Outcome and Death (NCEPOD) proposed the creation of a new classification that would unify GI bleeds regardless of the bleeding site. The age, blood tests, and comorbidities (ABC) score is a pre-endoscopic risk classification based on the patient's age, blood findings, and comorbidities, with which we can accurately predict the mortality of bleeding from the upper and lower GI system. The ABC score helps clinicians to distinguish severe patients with a high risk of mortality from mild ones with a low risk of mortality at an early stage (2). The incidence of upper GI bleeding in Europe in the general population is 19.43 to 57.03 patients per 100 000 people (3). The frequency of hospitalizations due to upper GI bleeding is six times more common than lower GI bleeding (4). The hospitalization of people with lower GI bleeding is 33-87 per 100 000 people, with a mortality rate of 2.5% - 3.9% (5). Mortality in lower GI bleeding is associated more with comorbidities than with the amount of bleeding (6), while with hemorrhage the rate is 1% (7). Recurrent bleeding is common for lower GI bleeding. The reported rehospitalization rate due to recurrent lower GI bleeding is 13.7% within 14 days and 19% within one year.

The risk factors contributing to recurrent lower GI bleeding include tumors, as well as an age over 65 years, in addition to antithrombotic and anticoagulant therapy (8). Anticoagulant drugs (AC) reduce the risk of thromboembolic incidents, but their main complication remains bleeding. Almost half of the bleeding associated with AC therapy is caused by bleeding from the GI system, with a similar bleeding rate between users of direct oral anticoagulant drugs (DOAKs) and patients using vitamin K antagonists (VKAs). The incidence of GI bleeding with AC therapy ranges from 0.5 to 1.6 per 100 patients with deep vein thrombosis (DVT), and 0.8 to 1.9 per 100 patients with atrial fibrillation (AF) (9). The mortality rate among DOAK users is significantly lower compared to VKA ones (10). Antithrombic therapy is the cause of 14,5% of all upper GI bleeding (11). For patients taking low doses of 100 mg aspirin, the risk of GI bleeding increases 1,8 times, and 7,6 times at high doses of 500 mg aspirin (12). The risk of GI bleeding grows significantly if the patient utilizes two antithrombotic drugs (11). The combined intake of anticoagulants and antithrombotic drugs raises the risk of upper GI bleeding by 60% and lower GI bleeding by 30%. Therefore, knowledge of the risk factors that lead to GI bleeding is important for the treatment of patients taking this therapy (13). The main reason for conducting this study is the fact that despite the large number of works examining the association of bleeding with anticoagulant and antithrombic drugs, most were based on an analysis of the incidence of hemorrhage, while only a small number focused on causal diagnoses, clinical severity, and death rate.

PARTICIPANTS AND METHODS

The cross-sectional study included patients of both sexes over 18 years of age admitted to the Clinic for Internal Medicine at the University Clinical Hospital (SKB) Mostar with a diagnosis of manifest GI bleeding and those with anemia

of an unknown cause who showed bleeding in the GI system at endoscopy. Only hospitalized patients in the period from January 1, 2019, to December 31, 2021, were analyzed. Of the 245 patients, 216 were included because of the incomplete data for the others. From the anamnesis and medical history, I obtained personal information relating to the patient, including their age and gender, type of bleeding, use and form of anticoagulant and/or antithrombotic therapy and state of consciousness upon admission, as well whether liver cirrhosis or a malignant tumor with metastases and comorbidities was present.

An endoscopy was performed within 48 hours of patient admission. Patients who underwent an endoscopy did not eat or drink anything for the six hours before. The endoscope with which the endoscopy was performed was an EVIS EXERA III CV-190, from the brand "Olympus". Values for urea, creatinine, and albumin were determined from samples of the liquid part of the blood (serum or plasma) by biochemical testing using different methods (the enzyme-linked immunosorbent assay (ELISA) test, rapid immunodiffusion or agglutination) with a specific analyzer, AU480, manufactured by "Beckman Coulter". I ascertained fatal outcomes from the discharge letters.

After collecting the data, I scored the patients according to the ABC score, which provides information about the severity of the clinical picture and the prediction of mortality within 30 days for patients with bleeding from the upper and lower GI system.

The ABC score is scored as follows:

Age: 1 point for patients 60-74 years old, 2 points for patients ≥75 years old.

Blood tests: 1 point for urea >10 mmol/L, 2 points for albumin <30 g/L, 1 point for creatinine level of 100–150 μmol/L and 2 points for creatinine level >150 μmol/L.

Comorbidity: 2 points for altered mental status, 2 points for liver cirrhosis, 4 points for disseminated malignancy, 1 point for an American Society of Anesthesiologists (ASA) score of 3, and 3 points for an ASA score ≥4.

The ASA score is graded so that healthy patients are categorized in the first class, those with mild systemic disease in the second, those with severe systemic disease in the third, those with several diseases that are a constant threat to their life in the fourth, those who cannot survive without surgery in the fifth and those with brain death in the sixth.

The ABC scores classified the risk of a mortality rate within the first 30 days by the sum of points. The patients were divided into two subgroups, one with those using anticoagulant and/or antithrombotic therapy and the other with those not utilizing the mentioned groups of drugs, and the results obtained from the ABC score were compared.

Statistical analysis

The results of the statistical analysis are expressed in absolute and relative frequencies, and as means and standard deviations. For all parametric variables and for each group, the data distribution was tested with the Kolmogorov-Smirnov test. The significance of the differences was tested by the chi-square test and Student's t-test for independent variables. The results of the statistical tests were interpreted at the significance level of $p<0.05$. P values that could not be expressed to three decimal places are shown as $p<0.001$. The statistical analysis of collected data was performed with the IBM Statistical Package for the Social Sciences (SPSS) program (version 25.0, SPSS Inc, Chicago, Illinois, USA) and Microsoft Excel 2019 (Microsoft Corporation, Redmond, WA, USA).

RESULTS

Disorders of consciousness were significantly more common in subjects who underwent therapy, who also achieved higher ASA scores, and had a lower risk of mortality. For other variables there were no statistically significant differences between the groups (Table 1).

Table 1. Differences in the investigated ABC score parameters in relation to anticoagulant and/or antithrombic therapy

	Therapy (anticoagulant and/or antithrombic)				χ^2	p
	Yes		No			
	N	%	n	%		
Age					5.363	0.068
<60	11	15.9	58	84.1		
60-74	13	28.9	32	71.1		
75+	32	31.4	70	68.6		
Altered mental status	13	65.0	7	35.0	15.352	**0.001**
Liver cirrhosis	2	18.2	9	81.8	0.062	0.732*
Disseminated malignancy	9	42.9	12	57.1	2.564	0.109
Urea >10 mmol/L	28	32.6	58	67.4	2.724	0.099
Creatinine					0.090	0.956
<100 µmol/L	39	26.5	108	73.5		
100–150 µmol/L	12	24.5	37	75.5		
>150 µmol/L	5	25.0	15	75.0		
Albumin	13	34.2	25	65.8	1.166	0.280
Death	11	34.4	21	65.6	0.928	0.335

*Fisher's exact test

Subjects with therapy achieved a significantly higher ABC sum than those without (Figure 1).

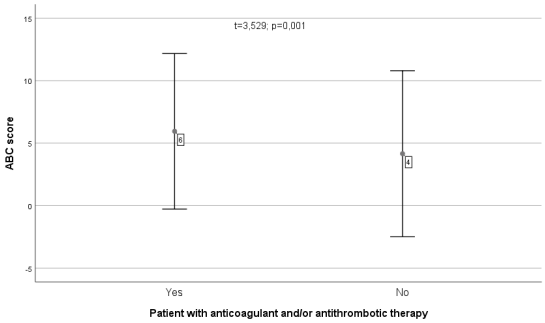

Figure 1. Differences in the results achieved for the ABC sum between the groups taking anticoagulant and/or antithrombic therapy

This study included 216 respondents, including slightly more men (121) than women (95), but the observed difference was not statistically significant. In the investigated sample, the highest incidence of melena was 89, while the least was occult bleeding (1), and the disparity was statistically significant. Considerably more subjects did not undergo therapy, and the difference was statistically significant. More subjects took rivaroxaban (19) compared to warfarin (8), and the variance was statistically significant. Most subjects took Andol (28), and the variation was statistically significant (Table 2).

In the studied sample, ulcer disease (43) dominated as the cause of bleeding, and the observed difference was statistically significant (Figure 2).

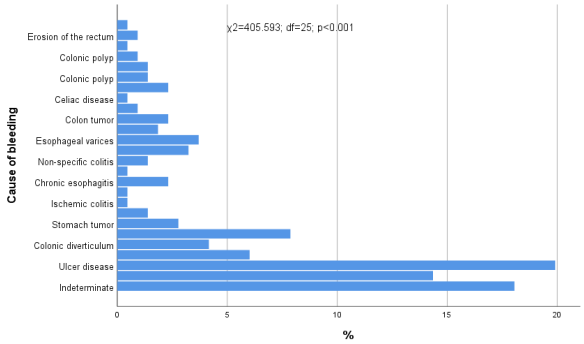

Figure 2. Differences in the cause of bleeding in the studied sample

Table 2. Differences in gender, form of bleeding, use and type of anticoagulant and/or antiplatelet therapy and indication for anticoagulant therapy

	n	%	$\chi 2$	p
Gender			3.130	0.077
M	121	56.0		
F	95	44.0		
Form of bleeding			244.963	**<0.001**
Melena	89	41.2		
Hematemesis	46	21.3		
Hematochezia	44	20.4		
Anemia of unknown pattern	14	6.5		
Melena and hematochezia	4	1.9		
Melena and hematemesis	16	7.4		
Hematemesis and hematochezia	2	0.9		
Occult bleeding	1	0.5		
Anticoagulant and/or antiplatelet therapy			50.074	**<0.001**
Yes	56	25.9		
No	160	74.1		
Type of anticoagulant therapy			4.481	**0.034**
Rivaroxaban	19	8.8		
Warfarin	8	3.7		
Type of antiplatelet therapy			39.455	**<0.001**
Andol	28	13.0		
Clopidogrel	2	0.9		
Andol and clopidogrel	3	1.4		

DISCUSSION

Given that the ABC score is a new classification of GI bleeding, there is no paper on this topic that I can compare with my results. However, impaired consciousness, one of the parameters of the ABC score, is statistically significantly more common in patients on anticoagulant and/or antithrombotic therapy. The state of consciousness of bleeding patients is most often preserved. However, severe GI bleeding can lead to a decreased blood flow to the brain and thus cause disturbances in the state of consciousness (16). This may be explained by anticoagulant and/or antithrombotic therapy which, in addition to the incidence of GI bleeding, causes more profuse bleeding (15). Research conducted at Oxford has shown that mortality from GI bleeding is very rare in all age groups and has no significant association with anticoagulant and/or antithrombotic therapy (17). A similar retrospective study was carried out in Portugal, where the effect of antithrombotic therapy on mortality within 30 days compared to patients without therapy was also not demonstrated, and it was concluded that, in fact, the factors that contribute most to mortality are comorbidities. Therefore, attempts to reduce mortality rates must focus on strengthening supportive care and the prevention of complications in other organs (18). At the end of 2021, an analysis of 509 patients with GI bleeding associated with anticoagulant and/or antithrombotic therapy revealed that patients on anticoagulant therapy

had a slightly higher mortality rate than those on antithrombotic therapy (19).

The gender data used in this paper coincide with those in an analysis in the US conducted on 350 000 patients where the majority were men, and the incidence of hospitalization for GI bleeding increased with age (20). A 30-year study in Finland found that the proportion of men with upper GI bleeding was as high as 65%, while the proportion of male patients with lower GI bleeding was 57.5% (21). The results of research from Germany show that patients older than 75 years have the highest incidence of GI bleeding (22).

Strate and Gralnek conducted a study that showed that the ratio of lower GI bleeding and upper GI bleeding is 1.86:1 (21). Despite a drastic drop in the incidence of ulcer bleeding between 2002 and 2012 from 81 to 67 patients per 100 000 people, it remains the most common cause of bleeding (24). Contrary to global literature, the leading source of bleeding from the lower GI system is not diverticula, but in this paper, it was hemorrhoids (8). Such results can be attributed to a smaller sample size and unperformed endoscopy in 15% of patients. In the period from 2013 to 2017, the prevalence of anticoagulant therapy increased from 9% to 12% in the general population, while it is 24,8% in patients with GI bleeding (24, 25). During this time, the usage of warfarin decreased by 45%-55% (25). The sharp decline in warfarin use is due to its numerous drug and food interactions, as well as its slow onset and cessation of action, difficulty in achieving therapeutic goals, and relatively high risk of bleeding, resulting in the need for continuous monitoring and dose modification (26). Due to the mentioned shortcomings of warfarin, new oral anticoagulants have been developed, which have the advantage of a relatively fast onset of action, as well as a comparatively short half-life, the utilization of fixed doses, and the lack of need for routine laboratory monitoring. In addition, DOAKs are as effective as warfarin in the prevention of cerebrovascular stroke and have been associated with a lower incidence of side effects such as intracranial hemorrhage (25).

According to an American study, one third or 33% of adults over the age of 40 took aspirin and/or other anticoagulants as a precaution (27). The vast majority said they were taking aspirin, while 3% stated they were also taking aspirin and other antithrombotic drugs, and 1% of patients were taking other antithrombotic drugs (28).

CONCLUSIONS

After analyzing the data, the study found that patients using anticoagulant and/or antithrombotic therapy had a higher sum for the ABC score. However, there were no significant differences in mortality rates between the patients receiving anticoagulant and/or antithrombotic therapy and those who were not. Patients undergoing anticoagulant and/or antithrombotic therapy were more likely to experience disorders of consciousness. Additionally, melena was the most common form of GI bleeding, and the most prevalent cause of GI bleeding was ulcer disease.

ACKNOWLEDGMENTS

None.

FUNDING

The authors received no financial support for the research, authorship and/or publication for this study.

CONFLICT OF INTEREST

The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

AUTHORS' CONTRIBUTIONS

MJR: contribution to study conception and design, literature review, supervision, writing the paper, interpretation of data, critical revision of the paper; AP: acquisition of data, contribution to study conception and design, literature review, critical revision of the paper, assistance in writing the paper; SR: acquisition of data, contribution to study conception and design, literature review, assistance in writing the paper.

ETHICAL BACKGROUND

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee.

Informed consent statement: Informed consent was obtained from all subjects involved in the study.

Data availability statement: We deny any restrictions on the availability of data, materials and associated protocols. Derived data supporting the findings of this study are available from the corresponding author on request.

REFERENCES

1. Zuccaro G Jr. Management of the adult patient with acute lower gastrointestinal bleeding. Am J Gastroenterol. 1998;93:1202-8.
2. Laursen SB, Oakland K, Laine L, Bieber V, Marmo R, Redondo-Cerezo E, et al. ABC score: a new risk score that accurately predicts mortality in acute upper and lower gastrointestinal bleeding: an international multicentre study. Gut. 2021;70:707-16.
3. Chandrasekhara V, Elmunzer J. Clinical gastrointestinal endoscopy. 3rd edition. Philadelphia:Elsevier;2019.
4. Rockall TA, Logan RF, Devlin HB, Northfield TC. Incidence of and mortality from acute upper gastrointestinal haemorrhage in the United Kingdom. BMJ. 1995;31:222-6.
5. Whitehurst BD. Lower gastrointestinal bleeding. Surg Clin North Am. 2018;98:1059-72.
6. Oakland K, Guy R, Uberoi R, Hogg R, Mortensen N, Murphy MF, et al. Acute lower GI bleeding in the UK: patient characteristics, interventions and outcomes in the first nationwide audit. Gut. 2018;67:654-62.
7. Oakland K. Changing epidemiology and etiology of upper and lower gastrointestinal bleeding. Best Pract Res Clin Gastroenterol. 2019;42-3:101610.
8. Sengupta N, Tapper EB, Patwardhan VR, Ketwaroo GA, Thaker AM, Leffler DA, et al. Risk factors for adverse outcomes in patients hospitalized with lower gastrointestinal bleeding. Mayo Clin Proc. 2015;90:1021-9.
9. Rockey DC. Gastrointestinal bleeding. Gastroenterol Clin North Am. 2005;34:581-8.
10. Ruf CT, Giugliano RP, Braunwald E, Hoffman EB, Deenadayalu N, Ezekowitz MD, et al. Comparison of the efficacy and safety of new oral anticoagulants with warfarin in patients with atrial fibrillation: a meta-analysis of randomised trials. Lancet. 2014;383:955-62.
11. Ibanez L, Vidal X, Vendrell L, Moretti U, Laporte JR. Upper gastrointestinal bleeding associated with antithrombic drugs. Aliment Pharmacol Ther. 2006;23:235-42.
12. Lanas A, García-Rodríguez LA, Arroyo MT, Gomollón F, Feu F, González-Pérez A, et al. Risk of upper gastrointestinal ulcer bleeding associated with selective cyclo-oxygenase-2 inhibitors, traditional non-aspirin non-steroidal anti-inflammatory drugs, aspirin and combinations. Gut. 2006;55:1731-8.
13. Abrignani MG, Gatta L, Gabrielli D, Milazzo G, De Francesco V, De Luca L, et al. Gastroprotection in patients on antithrombic and/or anticoagulant therapy: a position paper of National Association of Hospital Cardiologists (ANMCO) and the Italian Association of Hospital Gastroenterologists and Endoscopists (AIGO). Eur J Intern Med. 2021;85:1-13.
14. Brljak J. Zdravstvena njega u gastroenterologiji s endoskopskim metodama. Zagreb:Medicinska naklada;2013.
15. Oakland K, Desborough MJ, Murphy MF, Schachter M, Jairath V. Rebleeding and mortality after lower gastrointestinal bleeding in patients taking antithrombics or anticoagulants. Clin Gastroenterol Hepatol. 2019;17:1276-84.
16. Teles-Sampaio E, Maia L, Salgueiro P, Marcos-Pinto R, Dinis-Ribeiro M, Pedroto I. Antithrombic agents and/or anticoagulants are not associated with worse outcome following nonvariceal upper gastrointestinal bleeding. Rev Esp Enferm Dig. 2016;108:703-8.
17. Hosni M, Rahal M, Tamim H, Daniel F, Al Hashash J, Sharara AI, et al. Increased rebleeding and mortality in patients with gastrointestinal bleeding treated with anticoagulant drugs compared to antithrombic drugs. Eur J Gastroenterol Hepatol. 2021;33:490-8.
18. Kamboj AK, Hoversten P, Leggett CL. Upper gastrointestinal bleeding: etiologies and management. Mayo Clin Proc. 2019;94:697-703.
19. Vora P, Pietila A, Peltonen M, Brobert G, Salomaa V. Thirty-year incidence and mortality trends in upper and lower gastrointestinal bleeding in Finland. JAMA Netw Open. 2020;3:2020172.
20. Diener HC. Preventing major gastrointestinal bleeding in elderly patients. Lancet. 2017;390:435-7.
21. Strate LL, Gralnek IM. ACG clinical guideline: management of patients with acute lower gastrointestinal bleeding. Am J Gastroenterol. 2016;111:459-74.
22. Wuerth BA, Rockey DC. Changing epidemiology of upper gastrointestinal hemorrhage in the last decade: a nationwide analysis. Dig Dis Sci. 2018;63:1286-93.
23. Ilomäki J, Fanning L, Keen C, Sluggett JK, Page AT, Korhonen MJ, et al. Trends and predictors of oral anticoagulant use in people with Alzheimer's disease and the general population in Australia. J Alzheimers Dis. 2019;70:733-45.
24. Raposeiras Roubín S, Abu Assi E, Barreiro Pardal C, Cespón Fernandez M, Muñoz Pousa I, Cobas Paz R, et al. New cancer diagnosis after bleeding in anticoagulated patients with atrial fibrillation. J Am Heart Assoc. 2020;9:016836.
25. Hicks T, Stewart F, Eisinga A. NOACs versus warfarin for stroke prevention in patients with AF: a systematic review and meta-analysis. Open Heart. 2016;3:e000279.
26. Vrhovac B, Jakšić B, Reiner Ž. Interna medicina. 4th edition. Zagreb:Naklada ljevak;2008.
27. Gu Q, Dillon CF, Eberhardt MS, Wright JD, Burt VL. Preventive aspirin and other antithrombic medication use among U.S. adults aged ≥ 40 years: data from the national health and nutrition examination survey, 2011-2012. Public Health Rep. 2015;130:643-54.
28. Machado FR, de Matos Soeiro A, Conceição-Souza GE, Armaganijan L, Guimarães PO, Rosa RG, et al. Therapeutic versus prophylactic anticoagulation for patients admitted to hospital with COVID-19 and elevated D-dimer concentration (ACTION): an open-label, multicentre, randomised, controlled trial. Lancet. 2021;397:2253-63.