



Perioperative use of anticoagulant and antiaggregant drugs; approaches of anesthesiology and reanimation physicians in Türkiye: A survey study

Ali Eman^{a,*}, Onur Balaban^b

^aSakarya University, Training and Research Hospital, Department of Anesthesiology and Reanimation, Sakarya, Türkiye

^bSakarya University, Faculty of Medicine, Department of Anesthesiology and Reanimation, Sakarya, Türkiye

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Abstract

Aim: We aimed to assess the approach of Turkish Anesthesiology and Reanimation Specialists in patients receiving preoperative anticoagulant/antiaggregant therapy. A survey was designed to evaluate perioperative management of anticoagulant/antiaggregant drugs.

Materials and Methods: We surveyed Anesthesiology and Reanimation specialists and residents in various hospitals in Türkiye through e-mail and smartphone messenger application. We asked them to complete questionnaire form regarding anticoagulant use on a voluntary basis between February 15 and March 15 in 2022.

Results: The survey was responded by 296 anesthesiology specialists and residents. The majority of the participants (73.3%) were anesthesiology specialist physicians and work in 3rd level (academic, teaching, or university) hospital. The mostly used antithrombotic drugs were warfarin (75.9%) and acetylsalicylic acid (100%). Most of the participants (61%) use international guidelines regarding the timing of drug discontinuation. Participants commonly (82%) refer to the consultant specialist of the patient for deciding to discontinue or restarting the patient's antithrombotic drug. The major perioperative concern about the antithrombotic drugs was bleeding complications of central neuraxial procedures (44.8%).

Conclusion: The anesthesia and reanimation specialists in Türkiye manage antithrombotic drugs in accordance with international guidelines. The distribution ranges are wide in times of preoperative discontinuation and postoperative restarting times of the medications; thus, the awareness needs to be increased to clear up this controversy.



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Introduction

The number of elderly people in the general population is increasing in the world and in Türkiye. The statistical data in Türkiye shows that the ratio of the population aged 65 was 8.3% in 2016 and has increased to 9.7% in 2021 [1]. Due to the prolongation in life expectancy, the incidence of cardiovascular, cerebrovascular and thromboembolic diseases has increased [2]. Accordingly, the use of anticoagulant and antiplatelet drugs has also increased, which are used in a wide variety of diseases such as deep vein thrombosis, embolism, myocardial infarction and stroke [3,4]. The frequency of surgical interventions under anesthesia is increasing as well, in patients that use anticoagulants/antiplatelets. Perioperative management of anticoagulant and antiplatelet drugs has been challenging in patients undergoing surgical procedures due to the increasing

variation in these types of drugs [5].

Perioperative dosing and titration of anticoagulants gain importance if a possibility of perioperative ischemia or bleeding exists or a central block or a peripheral nerve block is planned for the patient [6]. It is important to maintain the perioperative coagulation and anticoagulation balance. There are many guidelines published for the purpose of perioperative management of these drugs with predetermined algorithms. These guidelines are being updated frequently to provide information about recently introduced drugs such as the new oral anticoagulants (NOAC) [7–9]. The aim of this survey study is to obtain recent information about the perioperative management of anticoagulant and antiaggregant drugs among anesthesiology and reanimation specialists in Türkiye. Our goal was to identify practices of the anesthesiologists in surgery patients using NOACs. Our secondary aim was to increase awareness of anesthesiology and reanimation physicians who work in different hospitals with different experience

*Corresponding author:

Email address: dralieman02@gmail.com (Ali Eman)

levels about management of new oral anticoagulants in surgery patients.

Materials and Methods

The study is a questionnaire-based survey which was approved by the Ethics Committee of Sakarya University, (Decision no: 02.02.2022-102077-04). The survey was sent to attending anesthesiologists and anesthesiology residents who work in various hospitals in Türkiye with the help of the Turkish Society of Anesthesiologists and Reanimation. The survey was sent to anesthesiologists by e-mail and by smartphone messaging application between February 15 and March 15 in 2022. We asked them to complete a questionnaire form on a voluntary and anonymous basis. The questionnaire included 21 prospective, one-choice or multiple-choice questions (Table 1).

The questions were based on four main subjects:

1. Demographic/professional characteristics of the participants.
2. Management of the perioperative use and discontinuation of anticoagulant and antiaggregant drugs.
3. Awareness about the importance of perioperative bleeding or thromboembolism.
4. How the decision of continuing or stopping drugs is made.

Statistical analysis

The sample size of this study was determined by the SurveyMonkey sample size calculator program, which can be accessed as an open source on the internet [10]. We estimated the number of specialists or residents currently working in Türkiye as 10,000 according to the information we received from the national society of anesthesiologists in Türkiye. When the population size was considered as 10,000, the confidence interval is 95%, and the margin of error is 5%, the minimum required sample size is calculated as 266. We used the Statistical Package for Social Sciences (version 20.0) software (IBM Corp., Armonk, NY) for the statistical assessment of the study data. Categorical variables were expressed as numbers and percentages, while continuous variables were expressed as mean ± standard deviation or median (interquartile range). We implemented descriptive statistical methods (mean, standard deviation, frequency) to evaluate the results of the study. p value <0.05 was considered as statistically significant.

Results

Totally, 301 participants responded to the questionnaire. Five participants were excluded from the study due to lack of data, and the remaining 296 participants were enrolled in the study. Demographic characteristics of the participants are summarized in Table 2. Since our study was planned as descriptive, no comparison was made between groups. The majority of the participants were anesthesiology specialist physicians and work in 3rd level (Academic, teaching, or university) hospital.

The mostly used antithrombotic drugs was found as warfarin (75.9%) and acetyl salicylic acid (ASA) (100%) which were the most frequent response of the participants.

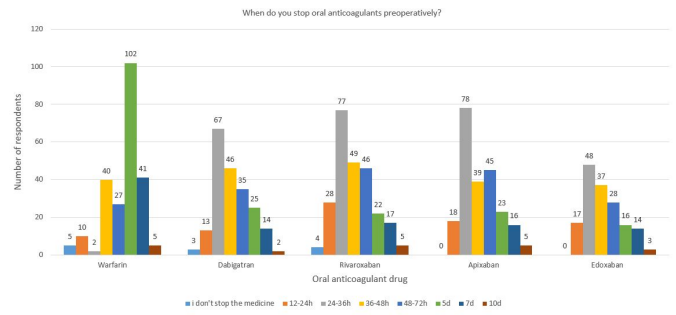
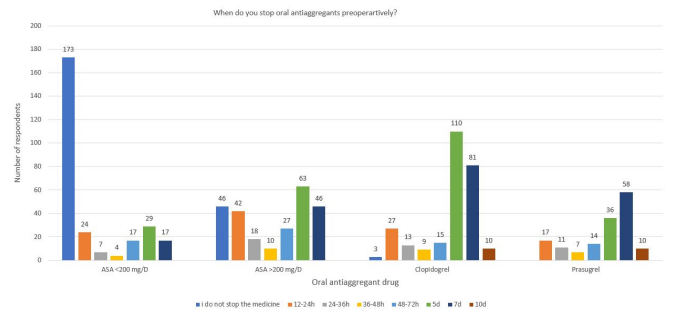
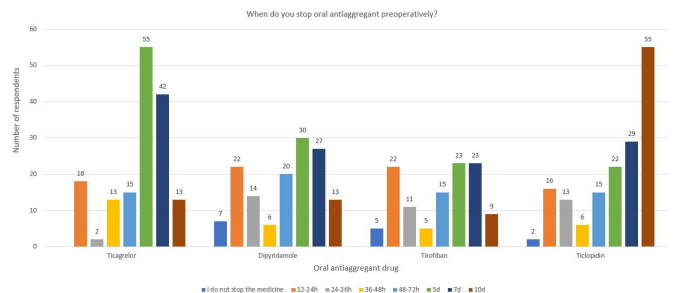


Figure 1. Graphic of the participants’ responses of preoperative discontinuation timing for oral anticoagulant drugs (h: hour, d: day). The values have been given as numbers.



(a) Graphic of the participants’ responses of preoperative discontinuation timing for oral antiaggregant drugs (h: hour, d: day).



(b) Graphic of the participants’ responses of preoperative discontinuation timing for oral antiaggregant drugs (h: hour, d: day).

Figure 2. Graphic of the participants’ responses of preoperative discontinuation timing for oral antiaggregant and anticoagulant drugs (h: hour, d: day). The values have been given as numbers.

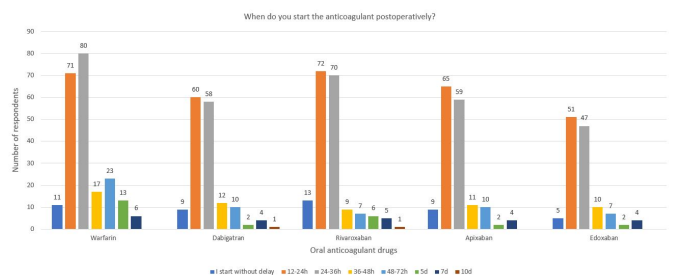


Figure 3. Graphic of the participants’ responses of postoperative restarting times of oral anticoagulant drugs (h: hour, d: day). The values have been given as numbers.

Table 1. The questions of the survey.

1. Gender
2. Academic title
3. Institution
4. Time of professional experience in your specialty (years)
5. Which oral anticoagulant drug(s) is most frequently used by your patients?
6. Which antiaggregant drug(s) is most frequently used by your patients?
7. Do you stop oral anticoagulants before an elective interventional procedure?
8. Do you stop oral antiaggregant drugs before performing an elective interventional procedure?
9. How do you make the decision to discontinue or continue anticoagulant/antiaggregant medication?
10. Is there are any medication(s) that you have not discontinued before elective surgery?
11. How much time before you stop the oral anticoagulant drug(s)?
12. How much time before the procedure you stop oral antiaggregant drug(s)?
13. How do you make the decision to discontinue anticoagulant/antiaggregant drugs?
14. Do you start any other medication for supplement until the day of surgery after you stop oral anticoagulants?
15. Which drug do you use as a supplement when you stop oral anticoagulant drugs?
16. Do you start any other medication for supplement until the day of surgery after you stop oral antiaggregant drugs?
17. Please specify if there is any medication you use as a supplement after you stop oral antiaggregant drugs.
18. How do you make the decision to restart anticoagulant/antiaggregant medications after the intervention?
19. How long after the procedure you start oral anticoagulant drug(s) again?
20. How long after the procedure you start oral antiaggregant drug(s)?
21. Which situation makes you most concerned, regarding discontinuation or continuation of anticoagulant/antiaggregant drugs in the perioperative period?

Table 2. Demographic characteristics, academic, institutional and professional information of participants.

Variables		n (%)
Gender	Female	158 (53.7)
	Male	136 (46.3)
Academic degree	Resident	59 (20)
	Specialist physician	171 (58.4)
	Assistant professor	14 (4.8)
	Associate professor	33 (11.3)
	Professor	16 (5.5)
Institutional information	Level 2 hospital	43 (14.5)
	Level 3 hospital	217 (73.3)
	Private Hospital	36 (12.2)
Experience in profession (years)	0-3	52 (17.7)
	4-6	44 (15)
	7-10	40 (13.6)
	10-15	84 (28.6)
	15 years and over	74 (25.2)

Among the participants 242 of them (82%) refer to the consultant specialist of the patient when deciding to continue or discontinue the patient’s antithrombotic drug. 178 participants (61%) stated that they mostly use international guidelines regarding the timing of drug discontinuation. In patients using anticoagulants, 129 (43.7%) of the participants discontinue the drug if a central neuraxial (spinal or epidural procedure) block is planned. In patients using antiaggregant drugs, the participants prefer not to stop the drug unless a major surgical intervention is planned and in surgeries with the possibility of bleeding (Table 3). Most of the participants (96.5%) answered yes to the ques-

tion of whether they would start any other substitute medication (bridging therapy) until the day of the operation when they stop oral anticoagulants, however, 10 (3.5%) participants stated that they would not start any substitute medication for anticoagulation. When the same question was asked whether to prescribe another drug instead of the stopped antiaggregant, 198 (69.2%) participants answered that they would give a substitute, while 88 (30.8%) participants answered that they would not start any substitute antiaggregant drug. Most of the participants prefer to use low molecular weight heparin (LMWH) as the substitute drug in the place of discontinued antiaggregant and anticoagulant drugs which was stated as 97.6% and 97.8%, respectively.

A total of 290 people answered the question, which is the mostly concerned situation regarding the usage of anticoagulant/antiaggregant drugs in the perioperative period. The complications that may develop due to central neuraxial block was the mostly given answer (44.8%). Among

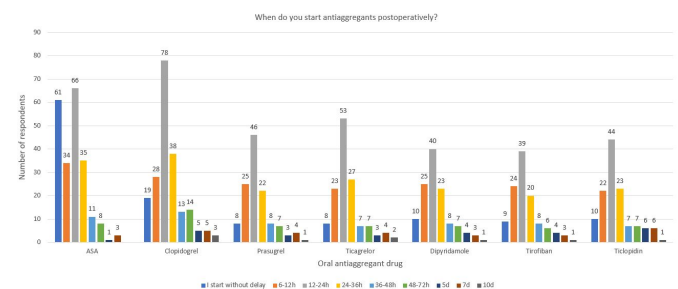


Figure 4. Graphic of the participants’ responses of postoperative restarting times of oral antiaggregant drugs (h: hour, d: day). The values have been given as numbers.

Table 3. The information of mostly used anticoagulant/antiaggregant drugs and the information of decision to stop or continue the drugs before and after the surgical operations.

Question (number of respondents)	Most frequent answer number of respondents (%)	2 nd most frequent answer number of respondents (%)	3 rd most frequent answer number of respondents (%)
Which oral anticoagulant drug(s) do your patients use most frequently? (294)	Warfarin 223 (75.9%)	Rivaroxaban 193 (65.6%)	Apixaban 140 (47.6%)
Which antiaggregant drug(s) do your patients use most frequently? (296)	Acetylsalicylic acid 296 (100%)	Clopidogrel 275 (92.9%)	Ticagrelor 69 (23.3%)
Would you discontinue oral anticoagulants before an elective surgical/interventional procedure? (293)	I stop the drug if central neuraxial (spinal-epidural) procedure is planned (regardless of the surgical procedure) 142 (48.5%)	I stop these drugs in all interventions and surgeries. 136 (46.4%)	I only stop the drug in major surgical procedures with the possibility of bleeding. 121 (41.3%)
Would you discontinue oral antiaggregant drugs before an elective surgical/interventional procedure? (295)	I only stop in major surgical procedures with the possibility of bleeding. 141 (47.8%)	I stop the drug if central neuraxial (spinal-epidural) procedure is planned (regardless of the surgical procedure) 129 (43.7%)	I consider the daily dose of ASA for decision to discontinue. 115 (39%)
How do you make the decision to stop or continue the anticoagulant medication? (295)	I consulted with the practitioner that prescribed the drug 242 (82%)	I consulted with the surgeon 128 (43.4%)	I make the decision myself 65 (22%)
What guides you decide to discontinue anticoagulant/antiaggregant drugs? (292)	I refer to international guidelines 178 (61%)	I check the latest regulations on the internet 124 (42.5%)	I use my educational information when I was resident or refer to institutional directories 95 (32.5%)
How do you make the decision to continue anticoagulant medications after the surgery? (291)	I consulted with the practitioner that prescribed the drug 131 (45%)	I consulted with the surgeon 77 (26.5%)	I allow the surgical team to make the decision 69 (23.7%)
Is there are any medication(s) that you do not stop?	Acetylsalicylic acid <200mg/day 218 (73.8%)	Acetylsalicylic acid >200 mg/day 47 (15.9%)	Dipyridamole 13 (4.4%)

The values are given as number of respondents and percentage.

the participants, 92 (31.7%) of them concerned about perioperative thromboembolism, and 68 (23.4%) of them concerned of perioperative bleeding.

The preoperative timing of discontinuation of the oral anticoagulant drugs of the participants is given in Figure 1. The participants' most frequent answer was 5 days for warfarin and 24-36 hours for dabigatran, rivaroxaban, apixaban and edoxaban. In addition, a limited number of participants preference was preoperative continuation for warfarin (5), dabigatran (3) and rivaroxaban (4). The range of the given answers for discontinuation time of each drug was remarkable.

The preoperative discontinuation times of the oral antiaggregant drugs are given as graphic in Figure 2a and 2b. The most frequent response was 5 days which was the response for clopidogrel, ticagrelor, tirofiban and also for ASA at a dose of >200mg/day. Most of the participants' (173) response was to continue ASA <200 mg/day (58.4%).

The preoperative timing of postoperative restarting times

of oral anticoagulant drugs is given in Figure 3. The mostly response was 12-24 hour for dabigatran, rivaroxaban, apixaban, and edoxaban, while the 24-36 hour was mostly given response for warfarin. The most frequent answer was "I start within 12-24 hours" all options for the antiaggregant drugs (Figure 4).

Discussion

The present study is the first survey about perioperative approach of anesthesia and reanimation specialists to anticoagulant and antiplatelet drugs in Türkiye. Perioperative management of anticoagulant and antiplatelet agents is important which may be life-threatening due to thromboembolic or hemorrhagic events before and after surgical procedures if inaccurately managed [5]. The risk of bleeding in the surgical procedure and the risk of thrombosis with the discontinuation of anticoagulant therapy should be balanced.

Considering the increase in the life expectancy and the rate of concomitant cardiovascular diseases in the patients un-

dergoing a surgery, anesthesiologists commonly encounter patients using these drugs. Due to recent introduction of new drugs, evidence-based guidelines have been published for perioperative management of antithrombotic drugs. The evidence-based guideline of the American Society of Regional Anesthesia and Pain Medicine and the guideline of the European Society of Regional Anesthesia (EE-SAIC/ESRA) are the mostly followed guidelines [7,11]. In accordance with the anesthesia societies, 61% of the participants in our study prefer to use these guidelines, however 42.5% stated that they also refer to the latest regulations on the internet when necessary. These results show that the decisions of continuation and discontinuation of antithrombotic drugs of the anesthesiologists in Türkiye are ruled by latest advancements.

The decision to stop or continuing oral antithrombotic drugs before performing an elective interventional procedure was evaluated separately for both anticoagulant and antiplatelet drugs. Although the majority of the participants stop the anticoagulant drugs before an elective surgery or a neuraxial procedure is planned, it was notable that 7 (2.4%) participants in the anticoagulant group and 20 (6.8%) participants in the antiplatelet group preferred not to stop these drugs before surgery. The number of people giving these responses seems to be relatively small, however anesthesiologists should be aware of potential catastrophic consequences, such as possible perioperative bleeding or hematoma, in patients using these drugs.

ASA still stands out as the most prescribed antithrombotic drug in patients with cardiovascular system [12]. The results of our study was consistent with the literature and revealed that ASA continues to serve as the first-line antiaggregant drug and the usage of warfarin is also common as an oral anticoagulant drug [13]. Warfarin was the mostly preferred drug in the oral anticoagulants group as per our study results. However, the total usage of NOACs has been found higher than warfarin in our study when rivaroxaban and apixaban are considered together.

Most of the participants (82%) preferred to consult with the specialist who first prescribed the drug, for the decision to discontinuation/restarting time of the antithrombotic medications. This may give rise to a thought that anesthesia and reanimation specialists do not prefer to be actively involved in decisions for discontinuation/restarting of these drugs. A relatively low number of anesthetists (22%) prefer to make the decision alone and a small number of anesthetists (3.4%) stated that they allow the surgeon to make the decision of discontinuation/restarting of antithrombotic drugs.

The results of our study revealed that anesthesiologists manage the perioperative usage of antithrombotic drugs mostly in accordance with the existing guidelines, however the distribution ranges are very wide in times of preoperative discontinuation and postoperative restarting times of the medications. The preoperative discontinuation time of warfarin, for example, varied between 0 and 10 days among the responses. A similar variation was notable in the postoperative restarting times of anticoagulant drugs. The anesthesiology and reanimation specialists seem to be confused about both the preoperative discontinuation time of drugs and the timing of restarting the drugs.

The mostly preferred substitute drug was LMWH for the discontinued antiaggregant and anticoagulant drugs. Especially in patients receiving dual antiaggregant therapy, serious complications such as coronary stent thrombosis, myocardial infarction, and death may occur as a result of lack of "bridge" treatment [11]. The majority of the participants do not stop ASA preoperatively at doses <200mg per day which is in accordance with the latest guidelines. Nonetheless, the awareness of anesthesiology and reanimation specialists still needs to be increased about bridging therapy, especially in patients using antiaggregant drugs.

Limitations of our trial include the national characteristic, which may not reflect the international trends truly. Another limitation is the heterogeneity of the participants that makes impossible to perform comparisons between specific groups.

Conclusion

In conclusion, the anesthesia and reanimation specialists in Türkiye make the decision of preoperative discontinuation timing of antithrombotic drugs and recontinuation after the surgery in accordance with international guidelines. Anesthesia and reanimation specialists are not actively involved in decisions for discontinuation of these drugs and prefer to consult with the specialist that have prescribed the drugs and consult with the surgeon for restarting the drug postoperatively. The distribution ranges are wide preoperative discontinuation and postoperative restarting times of the medications, thus the awareness of and anesthesiology and reanimation specialists need to be increased about perioperative management of antithrombotic drugs.

Ethics approval

Sakarya University, Faculty of Medicine Ethics Committee No:102077-04.

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