Evaluation of the approaches of the doctors working in the perioperative period in Türkiye to patient blood management

Eurasian Clinical and Analytical Medicine Original Research

Evaluation of patient blood management by doctors in Türkiye

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Abstract

Aim: Patient blood management is a thoroughly researched and inclusive strategy to improve care of patients who may need blood transfusions by utilizing a team-based approach. The World Health Organization (WHO) has been providing support for it since 2010. Patient blood management aims to improve patient safety by reducing mortality and morbidity rates while avoiding unnecessary blood transfusions and related products. Our research is focused on identifying the methods used by medical professionals in patient blood management during the perioperative phase and evaluating their level of understanding of the subject matter.

Methods: Between July and September 2022, a study was carried out, which consisted of 21 questionnaire questions focused on the method of patient blood management. The survey was electronically sent out to anesthesiologists and doctors of different branches who participate in preoperative preparations across numerous centers in Turkey, utilizing the Google Forms TM application.

Results: Out of all the participants, 59.8% have undergone training on patient blood management. Among them, 39.6% were aware of the perioperative anemia treatment protocol in their center. In the Anesthesiology group, there was a statistically significant increase in awareness that perioperative anemia can result in higher perioperative morbidity and mortality. Anesthesiologists preferred to delay surgery by starting oral iron replacement 4-8 weeks prior, while the other physicians preferred performing ES transfusion before starting replacement therapy.

Conclusion: Various European countries have adopted Patient Blood Management guidelines, and healthcare professionals have welcomed this approach. A survey conducted in Turkey shows a greater awareness of this practice, particularly in anesthesia.

Keywords

patient blood management, perioperative anemia, transfusion reactions

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Introduction

Patient Blood Management (PBM) is a well-researched and comprehensive strategy that aims to enhance the treatment of patients who may require blood transfusions, utilizing a team based approach.[1,2] The concept of PBM in perioperative care was introduced to the literature by James Isbister approximately 17 years ago as a novel approach.[3,4] Since 2010, the World Health Organization (WHO) has provided support for it. The primary objectives of PBM are to enhance patient safety by minimizing mortality and morbidity rates and to avoid unnecessary blood transfusions and blood products.[2] In regards to PBM, there are three fundamental goals: maintaining an appropriate hemoglobin (Hb) concentration, optimizing hemostasis to prevent excessive bleeding, and reducing blood loss while enhancing the patient's tolerance to anemia.[2] The ultimate goal is to enhance patient outcomes by effectively managing anemia and minimizing the risks associated with unnecessary blood and blood products.[5] The occurrence of perioperative anemia (POA) varies around 33% and is dependent on the surgical procedure (25-40%).[6-8] Hospital stays, and complications are more likely to occur when a patient has POA or receives a blood transfusion during the perioperative period. There is a direct correlation between POA and higher perioperative risk.[8] When PBMs are followed more strictly, the rate of postoperative complications and deaths tends to be lower. However, there are differences in practice due to different health care systems in countries. It is crucial to identify effective methods and strategies that offer practical solutions to achieve successful PBM. The main objective of our study was to identify the approaches employed by healthcare professionals in PBM and to assess their level of expertise on the matter. Our secondary aim was to analyze the approaches utilized by physicians at PBM clinics to adhere to existing guidelines.

Materials and Methods

The Health Sciences University Ankara City Hospital Clinical Research Ethics Committee 1 approved the study with the reference number E1-22-2521 on June 4th, 2022. We have created a survey that contains a total of 21 questions. Six questions are about personal information, while 11 are centered around preoperative anemia. The remaining four questions are about managing a patient's blood during surgery. The questionnaire was sent to participants electronically through the Google forms TM application. Participants were given information about the study's scope and purpose at the beginning of the questionnaire, and their informed consent to participate was obtained as volunteers. All responses were collected electronically. Physicians in the perioperative field in Turkey have been invited to participate in the survey.

Evaluation of Data

The study involved 634 physicians categorized into two groups: Anesthesiology and Reanimation physicians (AR) with 339 members and other surgical branch physicians (OSB) with 295 members. A comparison was made between the characteristics of physicians in these groups and their respective responses to the survey questions.

Ethical Approval

This study was approved by the Clinical Research Ethics Committee of Health Sciences University Ankara City Hospital (Date: 2022-06-04, No: E1-22-2521)

Statistical Analysis

The IBM SPSS 25.0 program was used for data analysis. The study data was evaluated using various descriptive statistical methods such as frequency, percentage, mean, standard deviation, median, and minmax. To compare qualitative data, the Chi-Square (x2) test was utilized.

Multiple comparisons were made using pairwise comparisons and Bonferroni correction. To assess the normal distribution of the data, we utilized both the Kolmogorov-Smirnov and Shapiro-Wilk tests. The comparison of normally distributed quantitative data between groups in the study was conducted using Independent Samples t-test and One-Way ANOVA (one-way analysis of variance). The accepted level of statistical significance was q=0.05. Power analysis was performed with the statistical package program G*Power 3.1.9.7 (Franz Foul, Universitat Kiel, Germany). The question posed in specialization comparisons is whether preoperative anemia increases perioperative morbidity and mortality. The parameters for the study were n1=339, n2=298, P1=0.97, P2=0.90, q=0.05, and a power of 95%.

Results

The general characteristics of the physicians participating in the study are shown in Table 1. The comparison of the participants' training on perioperative BPM and their approaches to anemia in the preoperative period are shown in Table 2. Out of all participants, 59.8% have undergone training on PBM. Among them, 39.6% were aware of the POA treatment protocol in their center. However, 41.5% stated that their center does not have such a protocol. 18.9% of the participants had no knowledge of such a protocol. The AR group showed a statistically significant increase in awareness that POA could result in higher perioperative morbidity and mortality. The AR group delayed surgery by starting oral iron replacement 4-8 weeks prior, while the OSB group preferred performing ES transfusion before starting replacement therapy. A statistically significant difference was observed between the groups in terms of iron deficiency treatment in the preoperative period. However, it was observed that the OSB group also preferred iron replacement therapy more than ES transfusion (46.8% and 20%, respectively). The transfusion choices made by participants during the intraoperative period are influenced by various factors, as shown in Table 3. There is a significant difference between the groups in terms of preferred strategies to reduce the need for blood transfusion during surgery. Observations from the AR group revealed significantly higher usage of acute normovolemic hemodilution, restricted blood volume and regulation of blood samples for diagnostic purposes, Tranexamic acid (TXA) , and Cell saver.

Discussion

According to our survey results, the participants highlighted the significance of preoperative anemia. Upon analyzing the responses

Table 1. Characteristics of the participants.

	AR (n=339)	OSB (n=295)	p
Age (years)	35.8 ± 9.6	37.8 ± 8.2	0.004[a]
Title			
Assistant doctor	177 (52.2%)	65 (22.0%)	
Specialist	120 (35.4%)	171 (58.0%)	
Doctoral lecturer	13 (3.8%)	17 (5.8%)	<0.001[b]
Associate professor	13 (3.8%)	28 (9.5%)	
Professor Doctor	16 (4.7%)	14 (4.7%)	
Institution where the participant is employed			
Public Hospital	48 (14.2%)	76 (25.8%)	
Training and Research Hospital	198 (58.4%)	149 (50.5%)	<0.001[b]
University Hospital	75 (22.1%)	34 (11.5%)	
Private Hospital	18 (5.3%)	36 (12.2%)	
Period of professional experience in the field of specialization			
0-5 years	178 (52.5%)	83 (28.1%)	
6-10 years	57 (16.8%)	96 (32.5%)	<0.001[b]
>10 years	104 (30.7%)	116 (39.3%)	
a: Independent Samples t Test (Mean ± SD), b: Chi-Square Test (n (%))			

a: Independent Samples t Test (Mean ± SD), b: Chi-Square Test (n (%))

Table 2. The comparison of the participants' training on perioperative BPM and their approaches to anemia in the preoperative period.

	AR (n=339)	OSB (n=295)	P*
Have you received any training on Perioperative Patient Blood Management?			
Yes	243 (71.7%)	136 (46.1%)	<0.001
No	96 (28.3%)	159 (53.9%)	
Do you believe that having anemia before surgery can lead to more complications during and after the operation?			
Yes	329 (97.1%)	266 (90.2%)	0.001
I still need to learn more about this subject	8 (2.4%)	21 (7.1%)	
No	2 (0.6%)	8 (2.7%)	
In which patients do you routinely check Hb levels before elective surgery?			
I check Hb levels in all patients	308 (90.9%)	263(89.2%)	0.475
I check Hb levels in patients with >1000 cc bleeding expected	30 (8.8%)	11 (3.7%)	0.014
I check Hb levels in patients with >500 cc bleeding expected	28 (8.3%)	6 (2.0%)	0.001
I check Hb levels in patients with additional systemic disease	35 (10.3%)	13 (4.4%)	0.008
I check Hb levels in patients describing symptoms of anemia	36 (10.6%)	15 (5.1%)	0.016
I check Hb levels in all patients	308 (90.9%)	263(89.2%)	0.475
Can you determine which patient group, based on the blood values provided, is suitable for anemia treatment prior to elective surgery?			
Women: Hb ≤ 8 g/dl, men: Hb ≤ 9 g/dl, pregnant woman ≤ 7 g/dl	84 (24.8%)	56 (19.0%)	<0.001
Women: Hb ≤ 9 g/dl, men: Hb ≤ 10 g/dl, pregnant women ≤ 8 g/dl	49 (14.5%)	69 (23.4%)	
Women: Hb ≤ 10 g/dl, men: Hb ≤ 11 g/dl, pregnant woman ≤ 9 g/dl	72 (21.2%)	98 (33.2%)	
Women: Hb ≤ 11 g/dl, men: Hb ≤ 12 g/dl, pregnant woman ≤ 10 g/dl	38 (11.2%)	38 (12.9%)	
Women: Hb ≤ 12 g/dl men: Hb ≤ 13 g/dl, pregnant women ≤ 11 g/dl	96 (28.3%)	34 (11.5%)	
Women: Hb ≤ 8 g/dl, men: Hb ≤ 9 g/dl, pregnant woman ≤ 7 g/dl	84 (24.8%)	56 (19.0%)	
When planning for elective surgery, are there certain patients who you regularly treat for anemia if you've noticed they have anemia before the surgery?			
In all patients	106 (31.3%)	161 (54.6%)	<0.001
In patients with minimal blood loss expected (between 500 and 1000 ml)	80 (23.6%)	46 (15.6%)	
Only in patients expected to have significant blood loss (>1000 ml)	92 (27.1%)	57 (19.3%)	
Only in patients who refuse blood transfusion	3 (0.9%)	2 (0.7%)	
I do not treat	58 (17.1%)	29 (9.8%)	
Which of the following preoperative treatments would you recommend?			
Transfusion of erythrocyte suspension just before surgery	128 (37.8%)	186 (63.1%)	<0.001
Preoperative iron/B12/folic acid replacement (replacement therapy for the cause)	192 (56.6%)	88 (29.8%)	<0.001
Preoperative use of EPO / Erythropoiesis Stimulating Agents	25 (7.4%)	4 (1.4%)	0.001
I do not treat	17 (5.0%)	21 (7.1%)	0.344
Which one do you apply as a replacement treatment plan in patients with preoperative iron deficiency anemia?			
Oral iron replacement is started for 4-8 weeks for patients scheduled for elective surgery, and I postpone the surgery until Hb and ferritin return to normal levels.	190 (%56.0)	138 (%46.8)	<0.001
I start IV iron replacement for patients scheduled for elective surgery and postpone surgery until Hb and ferritin are normal.	88 (%26.0)	66 (%22.4)[a]	
Oral iron replacement begins for patients scheduled for elective surgery; I prepare them for surgery without waiting.	12 (%3.5)	17 (%5.8)[a]	
I start iv iron replacement for patients scheduled for elective surgery; I prepare them for surgery without waiting.	23 (%6.8)	15 (%5.1)[a]	
In patients scheduled for elective surgery, I prepare them for surgery after erythrocyte suspension (ES) transfusion before starting replacement therapy.	26 (%7.7)	59 (%20.0)	

Chi-Square Test (n (%))

tothe inquiry on the differential diagnosis of preoperative anemia, it was observed that the serum ferritin factor was most commonly taken into account. It was noted that there were a high number of referrals to a hematology physician for differential diagnosis without requesting an examination, while the planning of anemia treatment according to guidelines was low. Approximately 54.1% of physicians working in the perioperative period either use these techniques or believe that they should be used and follow the guidelines accordingly. According to the data, TXA was used in 51.7% of cases as an alternative method to minimize bleeding during surgery, with the AR group more consistent with the guidelines recommended in this area.[9-12] According to a survey conducted by Bennett et al. on perioperative BPM applications during liver resection operations by surgeons and anesthesiologists, it was found that antifibrinolytics were the most frequently used technique for blood conservation during surgery. Anesthesiologists placed greater importance on hemoglobin levels when deciding on intraoperative transfusion, while surgeons prioritized the patient's hemodynamics.[13] In our research, we have found that the utilization of TXA to minimize blood loss during surgical procedures is substantial, as evidenced by our parallel study. In contrast to our research findings, it was observed that the AR group had a preference for a greater rate of hemodynamic change in transfusion decision making compared to the OSB group.

Table 3. The factors that influence the transfusion choices of participants during the intraoperative period.

	AR (n=339)	OSB (n=295)	P*
Could you provide information on when blood transfusions are typically performed during surgery?			
Hgb <7 g/dl	317 (93.5%)	262 (88.8%)	0.036
Undetermined tachycardia	111 (32.7%)	72 (24.4%)	0.021
Unexplained hypotension	128 (37.8%)	79 (26.8%)	0.003
Lactic acidosis with no identifiable cause	72 (21.2%)	27 (9.2%)	<0.001
Blood loss> 1000 ml	214 (63.1%)	182 (61.7%)	0.710
ECG changes for no reason	35 (10.3%)	14 (4.7%)	0.013
I do not transfuse blood	3 (0.9%)	11 (3.7%)	0.031
Other (please specify)	317 (93.5%)	262 (88.8%)	0.036
When erythrocyte transfusion is required in the intraoperative period, in which of the following situations would you transfuse?			
I ensure to prepare a minimum of two units of erythrocyte suspension every time.	13 (3.8%)	53 (18.0%)	<0.001
After every unit of erythrocyte suspension, I conduct a clinical reassessment.	268 (79.1%)	125 (42.4%)	<0.001
I check Hb after each unit of erythrocyte suspension.	194 (57.2%)	96 (32.5%)	<0.001
I provide 1 unit of Fresh Frozen Plasma along with each unit of red blood cells.	91 (26.8%)	128 (43.4%)	<0.001
Which of the following procedures would you use to reduce the need for intraoperative blood transfusion in your daily practice?			
Preoperative diagnosis and treatment of anemia	318 (93.8%)	266 (90.2%)	0.122
Acute normovolemic hemodilution	168 (49.6%)	58 (19.7%)	<0.001
Normothermia	194 (57.2%)	56 (19.0%)	<0.001
Using cell saver	80 (23.6%)	14 (4.7%)	<0.001
Blood-saving surgical techniques	176 (51.9%)	167 (56.6%)	0.237
Regulation of the number of blood samples taken for diagnostic purposes	98 (28.9%)	24 (8.1%)	<0.001
Tranexamic acid use	205 (60.5%)	123 (41.7%)	<0.001
Use of recombinant factor 7a	21 (6.2%)	8 (2.7%)	0.057
Use of fibrinogen concentrate	58 (17.1%)	40 (13.6%)	0.217

In a study conducted by Manzini et al. across multiple centers, physicians were queried about PBM and their responses were assessed.[1] A recent study found that 24% of the participants were not aware of the correlation between POA and complications during and after surgery, and more than 50% of clinicians did not consistently treat POA. According to the study, 38% of POA patients preferred ES transfusion as their treatment method. According to our research, it was discovered that 93.8% of the participants were knowledgeable about the correlation between POA and perioperative mortality and morbidity. Additionally, it was observed that this awareness was more prevalent in the AR group compared to the other group. Based on our findings, it was discovered that the percentage of untreated POA was 13.7%. Furthermore, it was observed that the AR group had a higher percentage of untreated POA compared to the OSB group. It is possible that the increased level of education and awareness regarding PBM management among our participants could account for the disparity in findings between the two studies. In 2015, Sherliker et al. conducted a study on the impact of PBM training practices in the UK on the attitudes of participants. After regulations were implemented and education levels improved, the efficiency of PBM practices saw a significant uptick according to the study's findings.[14] Our research revealed that the participants were knowledgeable about patient blood management and inclined to follow the guidelines. We believe that education and the development of protocols, in line with the guidelines set by each institution, can be an effective approach.

Limitations

A limitation of our study is that we had to prioritize certain stages of the PBM when structuring our questions. We were unable to thoroughly question every stage of the PBM due to its extensive scope and application. In future studies, the practical use of PBM can be assessed from various perspectives by examining different stages. Another limitation is that there are inconsistencies in numerous studies within the latest literature on iron usage. We have only selected the PBM guideline implemented in Turkey as an illustration.[15]

Conclusion

According to the literature, it has been demonstrated that the regulations pertaining to PBM are implemented in clinical practices and can be utilized effectively. Many European countries have implemented the PBM guidelines, which have also been adopted by numerous healthcare professionals. Through the survey we conducted in Turkey, based on the responses of the participants, we found that the level of awareness regarding PBM was notably higher across all branches, with a particular emphasis on the anesthesia field. We noticed that they were unsure about diagnosing anemia across all branches, including anesthesia. They required hematology consultation to arrive at a decision. With the help of clear instructions and training, we hope that the PBM protocols will be used in all hospitals and departments very soon. This will help all healthcare workers to be more aware of important procedures.

Declarations

Animal and Human Rights Statement

All procedures performed in this study involving human participants were in accordance with institutional and national ethical standards and the Declaration of Helsinki.

Informed Consent

Informed consent was obtained electronically from all participants before participation in the study.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest

The authors declare no conflict of interest.

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Scientific Responsibility Statement
The authors declare that they are responsible for the scientific content of the article, including study design, data collection, analysis and interpretation, manuscript preparation, and approval of the final version of the manuscript.

Abbreviations
AR: Anesthesiology and reanimation
ES: Erythrocyte suspension
Hb: Hemoglobin
OSB: Other surgical branches
PBM: Patient blood management
POA: Perioperative anemia
TXA: Tranexamic acid

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