Current transfusion practices of anesthesiologists in a major city in South India

Priyanka Pavithran, M. C. Rajesh[1], Suvarna Kaniyil[2], Kishore Kaniachalil, Bindiya Anoop[3], T. N. Jithin[1]

Department of Anaesthesiology, ASTER MIMS, [1]Department of Anaesthesiology, BMH, [2]Department of Anaesthesiology, Govt. Medical College, [3]Department of Anaesthesiology, MEITRA, Calicut, Kerala, India

Abstract

Background and Aims: Allogenic blood transfusion is a double edged sword with a delicate balance between benefits and risks. There is heavy use of blood products in the perioperative setting mostly initiated by anesthesiologists. Limited research has been done in evaluating the transfusion practices of anesthesiologists especially in Indian setting. We conducted a survey among the anesthesiologists in our city to assess their blood transfusion practices, to evaluate the level of adherence to principles of Patient Blood Management and to look for innovative strategies to improve the perioperative transfusions.

Methods: A validated questionnaire with four sets of questions was distributed among the practitioners in the Indian Society of Anaesthesiologists city branch and the responses were collected and analysed. The first and second parts were structured to assess the current blood transfusion practices. The third part evaluated the keenness of participants in further updating their practices as per the recommended protocols of patient blood management. The last part assessed how the participants would act in a given clinical scenario. Statistical analysis was done using Statistical Package for the Social Sciences version 21. Results are expressed in numbers and percentages.

Results: Moderate preoperative anemia was acceptable to majority of the responders. There was a high demand for continuing medical education in transfusion medicine and for formulating Indian guidelines for perioperative transfusion. The clinical scenarios demonstrated the restrictive transfusion strategy of the majority of our anesthesiologists. The lack of institutional protocols and blood transfusion committees was also seen.

Conclusion: The restrictive strategy of our practitioners was an encouraging finding. There is lack of uniformity in patient blood management services. Regular educational interventions are needed to update the clinicians. Formulation and implementation of institutional protocols for perioperative blood transfusion is mandatory.

Keywords: Patient blood management, survey, transfusion protocols

Introduction

Allogenic blood transfusion is a life-saving scarce resource. This calls for a critical approach to the use of blood products. Patient blood management (PBM) was formulated with the goal of optimizing its use.[1,2] Wide variability in transfusion practices among clinicians has been noted.[3,4] We conducted a survey among the anesthesiologists of our city with a primary objective of finding out their current blood transfusion practices, with a secondary objective of finding any scope for further improvements.

Material and Methods

A cross-sectional prospective questionnaire-based survey was planned. The survey was conducted over a period of 2 months. The questionnaire was designed by the three clinical investigators.

Address for correspondence: Dr. Priyanka Pavithran, Anugraha, 2/756-b, Othayamangalam Road, Karaparamba, Calicut - 673 010, Kerala, India.
E-mail: priyanka.pavithran@gmail.com

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Internal validation was done by three senior anesthesiologists and external validation by two senior pathologists leading the blood bank services. There are 169 members in our city branch. After excluding the postgraduates and cardiac anesthesiologists, we narrowed down our sample size to 102 practitioners. After obtaining ethics committee approval, the questionnaires were distributed and collected in person by the clinical investigators. Responding to the questionnaire was considered as a willingness to participate in the study. A telephonic reminder was given 1 week later, to those who did not return the questionnaire. Those not returning the questionnaire even after 1 week of the call were considered non-responders.

The questionnaire is composed of four parts. The first part required the doctors to answer a few questions on a Likert scale anchored with "Never" and "Always." The second part comprised of seven multiple choice questions related to blood transfusion practices. The third part had questions regarding guidelines and protocols, whereas the fourth part had four clinical scenarios to assess their clinical judgment.

The results were analyzed using Statistical Package for the Social Sciences version 21. The results are expressed in percentages and numbers. Some multiple choice questions had more than one response, and the percentages are expressed for each response and the total may exceed hundred percentage.

Results

Hundred and two questionnaires were distributed and 97 responses were obtained. The response rate was 96%. The mean age of the participants was 41.1 ± 9.4 years. Among the participants, 46 were female and 51 were male. The study group comprised of practitioners with varying clinical experience, practicing in all levels of healthcare. We obtained responses from both teaching and non-teaching institutions.

The first section had statements to which the practitioners responded on a Likert scale as relevant to their clinical practice. A large fraction (62.9%) of the responders use tranexamic acid in surgeries with a high risk of bleeding [Figure 1].

The second section had multiple choice questions related to the practices of blood transfusion. The minimum acceptable hemoglobin for elective cases is shown in Figure 2.

Sixty-three percent of the clinicians do not feel the need to do any testing in patients with no family history or risk factors for increased bleeding tendency.

Maximum allowable blood loss (35.1%) and vital signs (25.6%) were the most commonly followed measures to decide on the need for intraoperative transfusion by practitioners. When asked about changes in their transfusion practices in the past 5 years, 70.1% agreed to shifting to a lower transfusion threshold and avoiding transfusing to hemoglobin level >10 g/dl. Forty-four percent of the participants practice transfusing platelets rich plasma (PRP) and packed red blood cells (PRBC) in a ratio of 1:1 in cases of major bleeding, whereas 28% transfused only if platelet count was less than 50,000/μl. Preoperative hemoglobin (84%), comorbidity (69%), and anticipated bleeding (53%) seemed to be the most common factors influencing the decision to transfuse.

The third set of questions dealt with protocols and guidelines. Seventy-nine percent of the practitioners were aware of the American Society of Anesthesiologists (ASA) guidelines on perioperative blood management. Eighty-four percent of the respondents asserted the need for formulating an Indian guideline, whereas 91% of the doctors expressed their interest in attending a Continuing Medical Education on perioperative blood management. None of the institutions in the city had a massive transfusion protocol (MTP) or maximum surgical blood ordering schedule (MSBOS), and a large majority of the responders did not know if their institution had a MSBOS. A blood transfusion committee was present only in 21.4% of the institutions.

The fourth set of questions included four clinical scenarios [Table 1] where the participants needed to display their clinical judgment. For the questions (1) and (2), they were asked to choose their preoperative decisions from the four options given, whereas in questions (3) and (4), they had to choose their preoperative decision from the options (a) and (b) and intraoperative step from options (c) and (d).

For the ASA I 45-year-old lady with preoperative hemoglobin 8.5 g/dl, the majority (69) chose to cross-match and arrange PRBC and proceed to transfusion only if a need arises, whereas 23 of them opted to transfuse preoperatively. In the case of 35–year-old stage 5 chronic kidney disease (CKD) patient with hemoglobin 7.5 g/dl, most practitioners (64) decided to arrange blood and transfuse intraoperatively in case of need, and 16 physicians did not feel it necessary even to arrange blood.

Discussion

Our study revealed the wide variation in routine perioperative transfusion practices and incomplete adherence to principles of PBM. It highlighted the restrictive transfusion strategy of the majority of the anesthesiologists. The awareness of ASA guidelines on perioperative blood management was incomplete. The lack of institutional protocols was also seen.

Table 1: The clinical scenarios

Question	Number (total 97)
(1) In a 45-year-old ASA*, 1 female with menorrhagia, Hemoglobin -8.5 g/dl, posted for total abdominal *hysterectomy*	
a) Proceed with the surgery, without preoperative transfusion and with no blood arranged	3
b) Transfuse preoperatively and take up once hemoglobin is 9-10 g/dl and proceed	23
c) Do grouping and screening only without arranging blood and proceed with surgery	2
d) Cross-match and arrange PRBC†, with the plan of transfusing intraoperatively if need arises	69
(2) In a 35-year-old Stage 5 chronic kidney disease patient, Hemoglobin - 7.5 g/dl posted for foot debridement	
a) Proceed with the surgery, without preoperative transfusion and with no blood arranged	16
b) Transfuse preoperatively and take up once hemoglobin is 9-10 gm/dl and proceed	8
c) Do grouping and screening only without arranging blood and proceed with surgery	9
d) Cross-match and arrange PRBC†, with the plan of transfusing intraoperatively if need arises	64
(3) In a 60-year-old male witha history of CAD‡, carcinoma rectum posted for low anterior resection, Hemoglobin - 9.5 g/dl	
a) Proceed with the surgery, without preoperative transfusion	65
b) Transfuse preoperatively and take up once hemoglobin is >10 g/dl and proceed with surgery	32
c) I will definitely transfuse intraoperatively in view of preoperative anemia	21
d) I will transfuse intraoperatively only if patient becomes hemodynamically unstable or after checking hemoglobin	76
(4) In a 70-year-old man with no comorbidities, hemoglobin - 9.5 g/dl, posted for ORIF§ fracture tibia	
a) Proceed with the surgery, without preoperative transfusion	87
b) Transfuse preoperatively and take up once hemoglobin is >10 g/dl	10
c) I will definitely transfuse intraoperatively in view of preoperative anemia	9
d) I will transfuse intraoperatively only if patient becomes hemodynamically unstable or after checking hemoglobin	88

**American Society of Anesthesiologists, †Packed red blood cells, ‡Coronary artery disease, §Open reduction internal fixation*

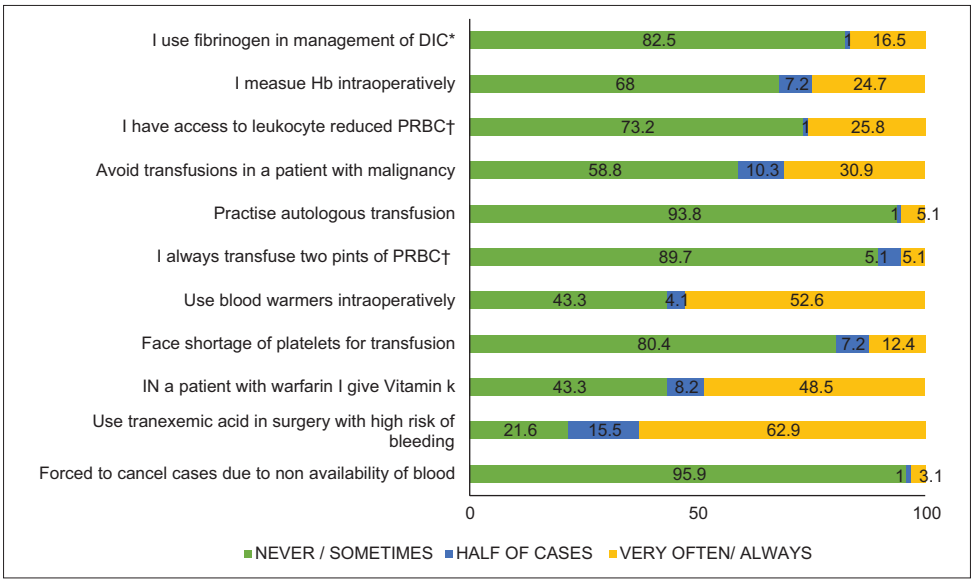

Figure 1: Transfusion practices. *DIC – Disseminated Intravascular Coagulation; †Packed red blood cell

This opens up avenues for improvement in the perioperative blood transfusion practices of our anesthesiologists.

As Karl Landsteiner said in his Nobel lecture in 1930, "*The number of transfusions given is surprisingly large and it may well be that the use of this technique has been taken too far.*" PBM is essentially an evidence-based multidisciplinary approach to optimize care of patients who may need an allogenic blood transfusion.

Only 62.9% of the practitioners used tranexamic acid routinely in surgeries with a high risk of bleeding. A survey by Baron *et al*.,[3] revealed that the rate of routinely performed interventions to limit blood loss like administering fibrinogen, vitamin K, and tranexamic acid were 60%, 52%, and 54%, respectively. Intraoperative hemoglobin measurement to guide transfusions is done regularly in only 24.7% of the responders. An audit done by Niraj *et al*.,[5] showed that only 20.7% cases had intraoperative hemoglobin estimation and these cases had a lower incidence of inappropriate transfusion.

A large majority of our responders do not consider it significant to avoid transfusions in patients with malignancy. A Cochrane review supported the association between perioperative blood transfusion and recurrence of curable colorectal cancer.[6] A majority of the anesthesiologists accepted elective cases with

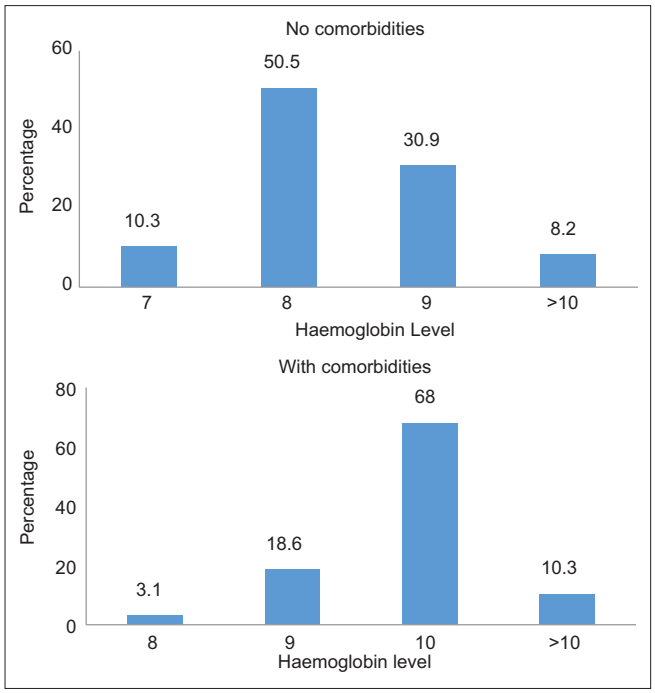

Figure 2: Minimum acceptable Hemoglobin levels for elective surgery

and without comorbidities at hemoglobin levels of 10 g/dl and 8 g/dl, respectively. The correction of anemia with the administration of iron or erythropoietin preoperatively for elective surgeries is strongly advised. Preoperative anemia is highly underrated.[7,8] Preoperative anemia correction is an important component of PBM.[9] However, these guidelines are according to WHO definition of anemia (<13.0 g/dL for men, <12.0 g/dL for non-pregnant women, and <11.0 g/dL for pregnant), which points in the direction of the need for Indian guidelines tailored to our population.

Thirty-seven percent of the practitioners felt it necessary to do laboratory investigations to rule out a coagulopathy in patients for elective surgery with no significant history. Current evidence does not support this practice of subjecting patients to unnecessary testing, which leads to delayed surgeries and increased financial burden.[10,11]

The questions according to clinical scenarios have shown that our anesthesiologists generally follow a restrictive transfusion strategy. This was shown in responses to all four questions where the majority preferred to avoid transfusions unless the patient had low intraoperative hemoglobin or became hemodynamically unstable. Question 2 also demonstrated the acceptance of a lower hemoglobin level in a chronic anemia condition like CKD and reluctance to transfuse a young CKD patient.

A major change in the transfusion practices is mandatory for the best patient care, and the main challenge is to change the clinician's behavior. We should not prefer the convenience and immediate benefits of allogenic blood transfusions over more troublesome but safer alternatives. Multiple strategies have been found to be effective in bringing behavioral and cultural changes in physicians.[12] We need regular educational programs to update and train our practitioners on transfusion medicine. Although there are massive transfusion protocols, no proper guidelines are present to guide clinicians on the management of bleeding in other scenarios. There are no proper guidelines for transfusion of platelets. The implementation of institutional blood transfusion protocols and strict adherence to PBM programs have been proven to be useful resulting in decreased transfusions and improved outcomes.[13,14] Regular audit and feedback can be helpful to put a curb on unnecessary transfusions. Blood transfusion committees play an important role in evaluating and improving transfusion practices, which unfortunately most of the hospitals do not have.[15]

Since this survey was limited to the practitioners in our city, we had only 97 participants. Small sample size is the limitation of our study. Long questionnaires result in poor response rates and increased number of incompletely answered questionnaires. Hence, we could not include questions to cover all components of PBM.

Conclusion

The results of the survey clearly show the shift in transfusion strategies to a more restrictive policy. There is a general demand for formulating Indian protocols and organizing continuing medical education for perioperative blood management. Our survey revealed the absence of institutional MTP, MSBOS, and blood transfusion committees, which can help improve patient management.

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Conflicts of interest

There are no conflicts of interest.

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Questionnaire

Current transfusion practices of anesthesiologists in a major city in South India

Age: Sex: Experience: <5 years/5–10 years/>10 years

Institution: Private/Government Teaching/ Non-teaching

1) Please rate the given statements according to the relevance to your clinical practice

1. – Always 2- Very Often 3 – In 50% of cases 4 – Sometimes 5 - Never

I am forced to cancel cases because of non-availability of blood
I routinely use tranexamic acid in surgeries with a high risk of bleeding
In a patient on warfarin, I administer vitamin K for preoperative optimization
I face shortage of platelets for transfusion
I use blood warmers intraoperatively
I transfuse two pints of PRBC in a patient requiring transfusion regardless of the clinical situation
I practice autologous transfusion
I prefer to avoid transfusions in a patient with malignancy
I have access to leukocyte reduced PRBC
I measure hemoglobin intraoperatively before transfusing blood
I use fibrinogen in the management of DIC

2) Please tick the option(s) most appropriate to your anesthetic practice

1) Minimum Hemoglobin level at which you accept an elective major case?

Patient with no comorbidities 7 g/dl/8 g/dl/9 g/dl/>10 g/dl

Patient with cardiovascular comorbidity 8 g/dl/9 g/dl/10 g/dl/>10 g/dl

3) Which all tests of coagulation do you order in a patient who has no history of abnormal bleeding?

a) BT b) CT c) aPTT d) PT/INR e) no test is required

4) What is your trigger for initiating intraoperative transfusion?

a) Vital signs b) Hemoglobin c) Percentage of MABL

5) In what ratio do you transfuse platelets in a case of major bleeding? (Platelets rich plasma: PRBC)

a) 1:1 b) 1:2 c) 1: 4 d) I transfuse platelets only if platelet count falls below 50000/μL

6) Has your management of perioperative bleeding changed in the past 5 years?

a) My transfusion threshold has now gone down to a lower level
b) I don't aim to transfuse to obtain Hemoglobin levels >10 g/dl now
c) I avoid colloids now
d) I transfuse PRBC: PRP: FFP in a ratio of 1:1:1 now
e) Others (please specify)

7) Which of the following factors influence your decision to transfuse intraoperatively?

a) Age b) Sex c) Presence of comorbidity
d) Preoperative hemoglobin
e) Presence of malignancy f) Anticipated bleeding
g) Presence of Sepsis/ARDS

8)

Are you aware of the ASA perioperative blood transfusion guidelines?	Yes/No
Do you feel the need for an Indian blood transfusion protocol tailored to our population?	Yes/No
Would you like to attend a CME program on the management of blood and blood products?	Yes/No
Do you have a massive transfusion protocol in your institution	Yes/No
Do you have a maximum surgical blood order schedule specific to your institution	Yes/No
Do you have a blood transfusion committee in your institution	Yes/No
If yes, does it have an anesthesiologist as a member?	Yes/No

9) Please choose your **preoperative management** in the following clinical scenarios

In a 45-year-old ASA, 1 female with menorrhagia, Hb–8.5 g/dl, posted for TAH with BSO

a) Proceed with the surgery, without preoperative transfusion and with no blood arranged
b) Transfuse preoperatively and take up once Hemoglobin is 9–10 g/dl and proceed
c) Do grouping and screening only without arranging blood and proceed with surgery
d) Cross-match and arrange PRBC, with the plan of transfusing intraoperatively if need arises

In a 35-year-old Stage 5 CKD patient on hemodialysis, Hb – 7.5 g/dl posted for foot debridement

a) Proceed with the surgery, without preoperative transfusion and with no blood arranged
b) Transfuse preoperatively and take up once Hemoglobin is 9–10 g/dl and proceed
c) Do grouping and screening only without arranging blood and proceed with surgery
d) Cross-match and arrange PRBC, with the plan of transfusing intraoperatively if need arises

10) Please choose your **preoperative plan from options (a), (b)** and **intraoperative plan from (c), (d)**

In a 60-year-old male with a history of CAD, case of Ca rectum posted for low anterior resection, Hb–9.5 g/dl

a) Proceed with the surgery, without preoperative transfusion
b) Transfuse preoperatively and take up once Hemoglobin is > 10 g/dl and proceed with surgery
c) I will definitely transfuse intraoperatively in view of preoperative anemia
d) I will transfuse intraoperatively only if the patient becomes hemodynamically unstable or after checking Hemoglobin

In a 70-year-old man with no comorbidities, Hb – 9.5 g/dl, posted for ORIF fracture tibia

a) Proceed with the surgery, without preoperative transfusion
b) Transfuse preoperatively and take up once Hemoglobin is > 10 g/dl
c) I will definitely transfuse intraoperatively in view of preoperative anemia
d) I will transfuse intraoperatively only if the patient becomes hemodynamically unstable or after checking Hemoglobin