



# The Results of Cardiac Surgery in Terms of Patient Blood Management in Türkiye Yüksek İhtisas Training and Research Hospital

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Dear Editor,

We read the interesting article by Sert et al. (1) published in Turkish Journal Anaesthesiology and Reanimation, wherein the primary aim was to compare the patient outcomes, requirement for transfusion, and cost of transfusion between two different periods with and without patient blood management (PBM) protocol. The authors found that the transfusion of unnecessary blood and blood products was reduced and the cost decreased with PBM protocol, although blood product usage did not affect 30-day mortality.

This article is valuable as it raises awareness about PBM, and will encourage centres to implement the PBM protocol. We want to thank the researchers and editors for bringing us this publication, and to highlight some points that may support the authors' aim and provide more information for future investigations.

The authors stated that patients with “deep anaemia” in the preoperative evaluation were consulted at the haematology department. However, the authors did not mention any description or the threshold considered for deep anaemia. This clarification will contribute to the consensus among anaesthesiologists on which patients should consult the haematology department. In literature, the haemoglobin threshold for deep anaemia was defined as 7 g dL<sup>-1</sup> (2, 3) or 8 g dL<sup>-1</sup> (4, 5).

In PBM protocol, the threshold for intraoperative transfusion was stated as 7 g dL<sup>-1</sup> in general and 8–9 g dL<sup>-1</sup> in patients with comorbidity, respectively. Moreover, in literature, some studies and reviews accept different thresholds for transfusion (6). However, in this article, the thresholds for the transfusions performed were not stated either before or after the PBM protocol.

In our opinion, specifying the number of patients, the threshold, and the number of units and type of blood product transfusion performed, in both groups, will enhance this article.

In the discussion section, the authors state that, after the PBM protocol, they discontinued the routine applications, patients were monitored more closely, and transfusion decision was taken only when necessary. We suggest the authors to clarify what they mean by “close monitoring” and “only when necessary”.

Expanding advanced monitoring methods have been a guide in making the right decision regarding the patients; however, conversely, it has become difficult to interpret the data correctly. Explaining the monitoring methods and

sharing how they guided the transfusion decision will not only increase the value of this article but also help guide clinicians.

Finally, we are concerned that patients operated at different time intervals are subject to a methodological bias in terms of the equipment used, as patients operated in 2012 and 2017 were compared. As is known, the mini-circuits have been used during perfusion since 2014, which reduced the need for priming and prevented haemodilution. Although there are no definite indications of transfusions or the circuit types used in this article, the high blood transfusion rates detected in 2012 may be secondary to haemodilution.

In conclusion, we agree that PBM implementation is essential for both patient safety and cost reduction; further research is therefore needed in this area.

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## Author's Reply

### Re: The Results of Cardiac Surgery in Terms of Patient Blood Management in Türkiye Yüksek İhtisas Training and Research Hospital

We would like to thank the readers for their valuable contribution. As already known, scientific methods show progress over time and the ideas put forward are shaped in detail as they are applied and evaluated more; and practices may vary in this context. Large-scale, multidisciplinary and full perioperative implementation are very laborious and require financial and medical support. When evaluated within this scope, it is observed that how far the patient blood management applications have come to the present status since the beginning.

The article we published in *Turk J Anaesthesiol Reanim* 2021 is a retrospective analysis. The most important result of this retrospective analysis comparing the standard practices in two different periods is the development over time. Ten years ago, two packs of fresh frozen plasma were given immediately after cardiac surgery as a routine practice. Unfortunately, this practice still continues in many centers. In addition, erythrocyte transfusion was performed to maintain hemoglobin value of 10 g dL<sup>-1</sup> or more and anemic patients were only treated by the hematologists at that time. Hematology consultation was absolutely necessary even to treat iron deficiency anemia

with iron, and all of these were evaluated as steps that prolong the process, and the solution of the problem by short-term transfusion was a common solution.

However, as information about PBM became widespread and awareness increased, restrictions on routine transfusion procedures began. The most important and the most difficult application in the cardiac surgery clinic of our hospital was to stop the routine transfusions even if there was no indication, and to quit off the habits of anesthesiologists and cardiac surgeons. This was the most basic but also very difficult step of PBM. The diagnosis and treatment of anemia at that time was quite new to other clinics and was performed only by hematologists. Hematology consultation was worth considering if hemoglobin value of 10 g or less was seen in patients seen in polyclinics, so this condition was considered as deep anemia at that time. In the following years, experts from all disciplines were given the authorization to write an iron preparation and to treat anemia.

In the first years of PBM, it was thought that the transfusion threshold must be kept higher in the presence of comorbidities, although in the following years, even if a comorbidity was accompanied, intraoperative 7.5 g dL<sup>-1</sup> and postoperative 8.5 g dL<sup>-1</sup> were sufficient. In our study, intraoperative blood gas values and detailed postoperative complications were not collected and could not be evaluated. Outcome information included only 30-day mortality. Our lack of data collection

and storage is unfortunately one of the biggest and unresolved problems of our country. Therefore, it is not possible to provide information about the desired intraoperative transfusion threshold hemoglobin value and indications for transfusion.









In addition, it was observed that only erythrocyte suspension and fresh frozen plasma were used and no other blood and blood products were used. It has been emphasized in our article that the requirements of each of the three pillars of PBM in our hospital have not been applied successfully, there are currently very few clinicians who can do so. It is also up to the individual to apply a restrictive blood management strategy in the intraoperative period, such as performing iron treatment in a patient with preoperative anemia. However, doctors who are aware of this issue take care of their patients and strive for optimization. In the past and today, blood transfusion is applied under the pretext of the surgeon's request even if a small amount of bleeding is present without any threshold. However, we tried to emphasize in our paper that; in time, not only the hemoglobin value in arterial blood gas, but also central venous oxygen saturation should be monitored, and the monitoring of cerebral oxygenation values by the introduction of near infrared spectroscopy would be guiding with the presence of tissue hypoxia necessitates transfusion.

The use of mini-circuits of cardiopulmonary bypass has never occurred in our hospital. Unless there is a miniCPB circuit, the change of the pump type will not change the hemodilution rates, of which traditionally deairing of the pump system requires an average of 1.2-1.5 liters of fluid. However, in the presence of anesthetists, surgeons and perfusionists who are aware of PBM, prime solutions in the existing pumps are taken out after the deairing process and not given to the patient since 2018. However, this practice is started after our study and still continues as a doctor dependent habit. Therefore, consideration of the readers about the use of excess blood products were due to hemodilution is inappropriate. Time bias is of course present in cross-sectional studies comparing practices in different periods, and since it is already an anal-

ysis of how much the practice has changed over the years. Such studies are performed by accepting time bias from the beginning, whether in domestic or foreign literature.

The main purpose of this paper is to show that PBM, which has a history of only 5 years in our country, can make a difference in the results of our hospital, which is one of the highest volume heart surgery centers of our country, even if the basic steps are fulfilled. Also, as mentioned by the authors, this kind of internal evaluation has not been done in our country before, although there are some imperfection in our article. The studies which are characterized by more comprehensive PBM with precise follow up of patients keep going in our clinic. We will be very excited to share the results of these researches with you in the future.

We again would like to thank readers for their attention to our paper and feel pleased if they keep following us.

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