

## Patient blood management in the perioperative phase of cardiac surgery: Every drop counts.

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### Description

The concept of “Patient Blood Management” (PBM) is well summarized by the following definition: “Patient-focused, evidence-based, systematic approach for optimizing transfusion of blood products to ensure high quality and effective patient care” [1].

PBM is particularly relevant to Cardiac surgery, which has a particularly high hemorrhagic burden because usually performed on cardiopulmonary bypass. This technique perturbs hemostasis by hemodilution, consumption of coagulation factors and platelet activation, thus resulting in high blood loss and transfusion rates [2].

The first definition of PBM, coined by the hematologist J. Isbister [3], places the patient and his needs at the center of a multidisciplinary approach aiming to achieve the best outcome.

This is easier said than done, because PBM implementation requires human and financial resources, management skills and continuous educational programs.

Furthermore organization of PBM team must overcome many hurdles. Some among them, such as resistance to adhere to team’s practices or integrate them in a multidisciplinary team, are generated by the response of individual caregivers. Others, typically financial constraints, originate from general health policies and/or institutional strategies.

When considering the workflow required to manage a patient planned for Cardiac surgery (Figure 1), multiple stakeholders have to be considered specifically in relation to PBM :

The PBM process encompasses distinct phases, each using specific tools, but with a common final aim. This is well illustrated by the “Three PBM pillars” concept: enhancement of the red cells mass in the preoperative phase, minimization of blood loss in the intraoperative one and management of post-operative bleeding. All these actions aim to minimize anemia and preserve patient’s “physiological reserve”, as required to reduce the extent and impact of reduced oxygen delivery to tissues [4].

Whereas the “Three pillars” stand on a rationale easy to understand, their implementation is not as straightforward. For instance, the last two decades of experience taught us that, while preoperative anemia is an important cause of adverse outcome after cardiac surgery, the transfusion of red blood cells is often associated with a worse post-operative prognosis. Otherwise said: “Anemia is bad, transfusion is worse, and both together are worse than either one alone” [5]. Therefore, it is worth reminding that the transfusion has always to be considered as an allogeneic graft: awareness towards its pros and cons is pivotal. Ready availability and improved safety of blood products of today should not discourage from a thorough assessment of the need to use them [6].

In the prescription and management of transfusion medicine, the balance between drawbacks and benefits should be patient-tailored. Indeed, analyzing the literature about transfusion “triggers”, i.e. the boundary condition prompting a transfusion, we did not find any superiority of liberal transfusion strategy (hemoglobin threshold <10 g/dl) versus a restrictive one (hemoglobin threshold of <7 g/dl) [7,8].

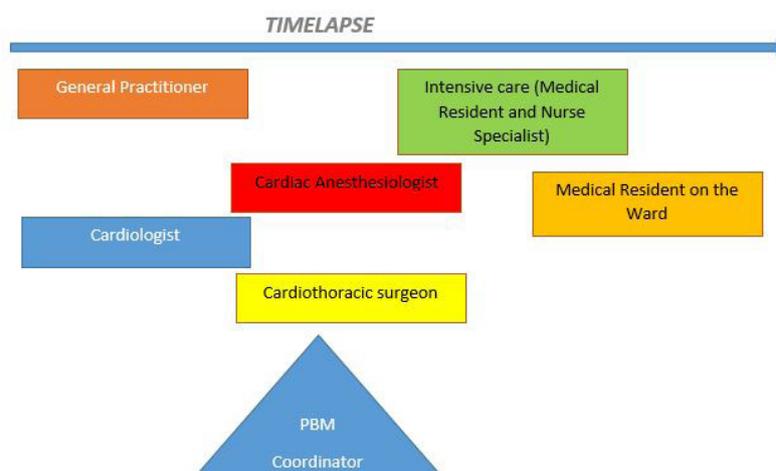


Figure 1. Workflow of multiple stakeholders for cardiac surgery in relation to PBM.

The World Health Organization has endorsed PBM in 2010 and stressed the role of “Clinical Nurse PBM Coordinator” as a key figure in both the organizational and operative phases of the process. Among its many functions, this professional is expected to provide clinical leadership and consultancy to nursing staff and, at the same time, to interface with the medical and laboratory teams. This considered, is clear why the Nurse Coordinator has a key role in the network developing, implementing and updating PBM procedures and is responsible for continuing education of the staff in this specific field [9].

Focusing on the role of intensive care unit Nurse and particularly in the post Cardiac Surgery care we can underline some general principles for PBM, easily applicable to everyday practice in the ICU setting:

1. Use of closed loop systems and routine micro sampling to analyze blood, paying attention to avoid standing orders (common practice in ICU setting).
2. Fast-track procedures after cardiac surgery in intensive care could have potential benefits: among them, we emphasize the sparing of unnecessary use of hypnotic agents that can lead to inappropriate vasodilatation and lastly overzealous fluid resuscitation.
3. Being accurate in the detection and correction of hypothermia; this latter is directly related with coagulation troubles and delays in weaning from mechanical ventilation.
4. Attention to patient’s tolerance of anemia. Beside Hemoglobin levels, reporters of the oxygen delivery/consumption balance such as serum lactate and central venous saturation, should be considered.
5. Optimizing pain control in order to minimize oxygen consumption.
6. Being aware of different transfusion triggers and, rather than targeting a fixed threshold hemoglobin level, adapt them to the specific clinical status; it is strongly recommend to assess indications (drawback/ benefit ratio) before transfusion and, if indicated, use a single unit RBC transfusion policy in patients that are not actively bleeding.

In fact being the closest caregiver to the patient, the ICU Nurse is in the best position for early detection of clinical problems and for directly responding with comprehensive bedside care.

In conclusion, all the different aspects of PBM are tiles a mosaic of optimal caregiving in which nurse’s and clinician’s activities are strictly complementary. This said, a lot of effort must be constantly devoted to achieve and maintain coordination among caregivers, which is strictly required to PBM implementation.

Get the hint: Rome wasn’t built in a day; the same concept is valid for PBM.

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