Guidelines for Transfusion in Cardiac Surgical Patients

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The transfusion of blood and blood products represents a critical and complex issue in the care of cardiac surgical patients. While the transfusion of these products can be life saving, it can also be associated with significant morbidity and mortality. This dichotomy generates many difficult clinical scenarios for caregivers. At BIDMC we are committed to bringing the best outcome for our patients; this requires weighing the benefits and risks of every transfusion intervention.

The following is a policy regarding perioperative blood conservation strategies and blood component therapy for cardiac surgical patients at BIDMC. The perioperative period will be defined as the immediate preoperative and intraoperative periods with extension into the first 24 postoperative hours. Certain clinical scenarios may be suited to further extension.

Inherent to the policy are the following principles:

- The judicious use of blood components will be a priority
- Blood component replacement therapy will be based on thoughtful assessment of the clinical situation in conjunction with as much scientific evidence, i.e. laboratory data, as can be reasonably obtained; not on individual caregiver preference
- Open communication and discussion amongst caregivers as it relates to blood loss and transfusion must be reinforced
- Open communication with blood bank personnel to assure receipt of blood products in an efficient and timely manner.
- The policy will be agreed and adhered to by all involved in the care of cardiac surgical patients, whether that care occurs intraoperatively or postoperatively

During the perioperative period, the following strategies will be employed to help reach the aforementioned goals:

- An active type and screen should be in the blood bank a minimum of 24 hours prior to surgery.
- An antifibrinolytic will be administered to every cardiac surgical patient requiring cardiopulmonary bypass (CPB), unless there exists a contraindication to its use
- All reasonable attempts will be made to withdraw whole blood from the patient in the pre-CPB period to be reinfused in the post-CPB period. This practice will require a careful evaluation of patient hematocrit, size, and preload dependency to establish candidacy and will be carried out as outlined by institutional standard of practice
- All reasonable attempts will be made to limit the quantity of crystalloid solution given to patients to minimize hemodilution

- Anesthetic management will coordinate with perfusion management to allow for the successful employment of other blood conservation techniques, e.g. retrograde autologous priming of the CPB circuit
- After the completion of CPB, all attempts will be made to salvage the blood remaining in the CPB circuit with or without washing
- All attempts to reduce the quantity and volume of blood draws will be made
- The blood bank resident on-call (30003) will be paged if there are concerns regarding blood products for the patient.
- The following set of transfusion guidelines will be made readily available to help guide transfusion practice. However, transfusion therapy should be individualized for each patient and clinical situation

General Guidelines for Transfusion Therapy

Red Blood Cell Transfusion Triggers

- Red blood cell transfusion should not occur when hematocrit is ≥ 30 unless there is uncontrolled hemorrhage or evidence of non-cardiac end-organ ischemia
- When hematocrit is ≤ 18, red blood cell transfusion is reasonable in all cardiac surgical patients
- When hematocrit is ≤ 21, transfusion is reasonable in most patients having cardiac surgery
- When hematocrit is ≥ 21, the transfusion of red blood cells should be guided by an assessment of the adequacy of oxygen delivery, i.e. laboratory or clinical evidence of inadequate oxygen delivery, and by an assessment of the risk for developing critical end-organ ischemia, particularly of the brain (e.g. history of cerebrovascular disease, diabetes, etc.)
- These hematocrit thresholds are reasonable during the defined perioperative period
- These triggers represent guidelines and clinical scenarios may require deviation

Non-Red Cell Hemostatic Blood Products

Transfusion of these products is often complicated by the often by the asynchrony between sudden clinical events and the timely availability of test results. Surgical issues can also make assessment difficult. This results in the following basic tenet:

- Non-red cell hemostatic blood products should be transfused based on clinical evidence of bleeding, preferably guided by laboratory tests that can accurately assess hemostatic function

Aside from this, the following represent other guidelines regarding these products:

- DDAVP should only be used in patients with platelet dysfunction known to respond to this therapy (e.g. uremia, von-willebrand's disease). It should never be given prophylactically or routinely
- Cryoprecipitate should only be administered for hypofibrinogenemia (fibrinogen <100) or during massive transfusion. It should not be used to replete other factor deficiencies
- In settings other than massive transfusion, fresh frozen plasma is rarely indicated for an INR<1.5
- Prophylactic platelet transfusions are generally not required
- Other causes of bleeding should be considered for a platelet count > 100,000 unless the patient has known or suspected platelet dysfunction
- A bag of apheresis platelets can be obtained from the blood bank within five minutes and should raise the platelet count by approximately 60,000. Platelets should be ordered only one bag at a time, unless a massive transfusion situation exists

- Factor VIIa is not unreasonable to give for intractable, unresponsive, non-surgical bleeding. The risk for thrombosis must always be weighed against risk of bleeding.
- Protamine dosing should, as much as is possible, be based on testing that specifically measures the presence or activity of heparin
- An isolated, elevated PTT in a cardiac surgical patient with a normal preoperative PTT is almost always the result of heparin and can be treated with an appropriate dose of protamine

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