June 17, 2013

MASSACHUSETTS GENERAL HOSPITAL
HEART CENTER

MASSACHUSETTS GENERAL HOSPITAL
INSTITUTE FOR HEART, VASCULAR AND STROKE CARE

Blood Antibody Notification Protocol

Purpose: The purpose is to establish a clear process for communication of the presence of blood antibodies for patients undergoing cardiac surgical procedures

Goal: The goal is to assure that all concerned parties are notified of the presence of blood antibodies including cold agglutinins and minimize the chance that patients are subject to risks associated with delayed transfusion of blood products.

Background: The presence of **abnormal blood antibodies** against red blood cells and platelets can prove disastrous during transfusion of blood products. Cardiac surgical patients are among those most likely to receive transfusions during the course of their perioperative care.

Cold agglutinins are antibodies to red blood cell antigens that can cause systemic thrombosis and hemolysis. The reported incidence among cardiac surgical patients is 0.8-4.0%. Thrombosis may occur at the onset of cardiopulmonary bypass and manifest as high line pressures in the bypass circuit and visible agglutination. The effects of cold agglutinins are dependent upon the amount of antibody present (titre) and the temperature at which agglutination occurs (thermal amplitude). The higher the thermal amplitude is, the warmer the temperature at which agglutination and problems occur.

Anti-Phospholipid Antibody Syndrome (APS) is a rare condition complicated by hypercoagulability. Patients often present with deep venous thrombosis (DVT) or pulmonary embolization. APS may occur in up to 2% of the general population. These patients often have coronary artery disease and valvular abnormalities. These patients are also vulnerable to early graft stenosis. If a lupus anticoagulant is present, sometimes the lupus anticoagulant will artificially prolong the activated clotting time (ACT) in the presence of heparin (note that a normal baseline ACT does not exclude the possibility that the lupus anticoagulant will prolong the ACT more than expected when heparin is present). Therefore, monitoring patients with lupus anticoagulants can be a challenge during cardiopulmonary bypass because the ACT is a phospholipid dependent test that may be artificially prolonged by the presence of a lupus anticoagulant. There is no consensus to manage these patients although several are utilized including empiric doubling of the baseline ACT, monitoring anti-Xa levels, obtaining heparin concentrations (Hepcon), or performing heparin/ACT titration curves pre-op.

Policy:

1. All patients presenting for elective cardiac surgery will undergo screening for the presence of antibodies or cold agglutinins

2. When an abnormal antibody or cold agglutinins are detected during pre-operative screening the nurse practitioner will consult the cardiac anesthesia consultation staff member (beeper #21400).
3. The cardiac anesthesia staff member or designated trainee will discuss the case directly with the blood bank attending.
4. The cardiac anesthesia staff member will document the nature of the discussion and document the following
    a. **Cold agglutinins**
        i. Titer (high, medium, low)
        ii. Thermal amplitude
        iii. Potential impact on transfusion
            1. Patients with low antibody titer and a low thermal amplitude (temperature of agglutination) can generally undergo surgery without changes in bypass management.
            2. Patients with a high antibody titre and a high thermal amplitude generally require maintenance of higher temperatures and warm cardioplegia. The Blood Transfusion Service will contact cardiac anesthesia when patients have a high titre, high thermal range antibody detected pre-op.
            3. For questions on individual patients, contact Blood Transfusion Service MD on call (MD on duty listed in the MGH On-call Directors under "Blood Transfusion Service".

    b. **Abnormal blood antibodies**

    Look in CAS under Results > Lab > Blood Bank > Tests to see if the patient has a positive antibody screen (ABSCRN) or a positive antibody ID (ABID). If the antibody ID is positive (eg, anti-K) look in Results > Reports > Notes > RBC Antibody ID for a full report which describes how difficult it is to match blood.
        i. Type of antibody
        ii. Potential impact on transfusion (difficult with match)
        iii. Blood that will be available

    c. **Antiphospholipid antibody**

    Look in CAS under Results > Lab > Coagulation > Antiphospholipid Antibody to see if the patient has a positive lupus anticoagulant test result. Look in the same area for Special Coagulation Interpretation for details on the significance of the finding. For any individual patient *questions, contact the Thrombosis and Hemostasis Service MD on duty (MD on duty is listed in the MGH On Call Directors under "Hematology Oncology"). Testing cannot be performed if the patient is on dabigatran, argatroban, or bivalirudin (because these cause false positive results). CRP >53 can also cause false positive results in the confirmatory assay.
5. The Cardiac Surgery Pre-operative Evaluation Nurse is expected to communicate the blood abnormality to the attending surgeon.
6. The cardiac anesthesia team will be responsible for communicating blood plans to the surgical and perfusion teams.

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References:

1. Atkinson VP, Soeding P, Horne G, Tatoulis J. Cold Agglutinins in Cardiac Surgery: Management of Myocardial Protection and Cardiopulmonary Bypass. Ann Thorac Surg 2008;85:310-1.
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3. Fisher GD, Claypoole V, Collard C. Increased pressures in the retrograde blood cardioplegia line: an unusual presentation of cold agglutinins during cardiopulmonary bypass. Anesth Analg 1997;84:454-6.
4. Koniari IK, Siminelakis SN, Baikoussis NG, Papadopoulos G, Goudevenous J, Apostolakis E. Antiphospholipid syndrome; its implication in cardiovascular diseases. J Cardiothorac Surg 2010;5:1-10.