REX HEALTHCARE

Laboratory Bulletin...

Updates and Information from Rex Healthcare and Rex Outreach

February 2001 *Issue Number 53*

New Armbands for Patients with Blood Bank Orders

Meticulous attention to correct patient identification has long been recognized as one of the most important safeguards in transfusion medicine. As shown in data collected by the Food and Drug Administration, Centers for Disease Control and large blood centers, serious and fatal hemolytic transfusion reactions continue to occur each year across the country. Investigation of these events consistently shows the most common cause is misidentification of the patient or the blood sample for crossmatch. Recognition of this problem has led to strict application of our laboratory specimen labeling policy for blood bank samples.

The JCAHO has also recognized and addressed the significance of this problem in a Sentinel Event Alert publication for hospitals. Blood Services and Nursing have been auditing and reviewing our transfusion policies and procedures in the context of the JCAHO Sentinel Event Alert recommendations, and reporting the ongoing findings to the Performance Improvement Committee at Rex. We have adopted, or in the process of adopting, all of the recommendations for maximizing blood transfusion safety. One of the recommendations from JCAHO includes using unique identification bands for patients receiving blood transfusions. This practice is already used in a number of hospitals nationwide. We currently use these unique armbands at Rex for patients with autologous blood, outpatients and for some cardiac cath. patients. However, in the near future, **all** patients who have a blood order that could lead to transfusion, i.e. type and screen or crossmatch will receive the familiar Hollister arm band already used in selected patients.

The armband will be placed on the patient when the blood sample for type and screen or crossmatch is drawn, and must remain in place until the need for transfusion is over. The unique Hollister arm band number will be placed on the blood sample tubes, along with the other identifying information, and will also be recorded on the transfusion record form and blood bags. The Hollister arm band number will be used in addition to patient name and medical record number to verify that the bag of blood matches the patient identification of the person about to receive the transfusion. If the armband has been removed prior to transfusion, a new armband will be required along with a new blood sample for crossmatch before transfusion may occur.
This expansion of our blood order armband policy will further reduce the risk of patient misidentification that could potentially lead to a hemolytic transfusion reaction.

Timothy R. Carter, MD
Medical Director Blood Services

ABG ≠ CO

Just a reminder than an arterial blood gas study (ABG) does not include either carboxyhemoglobin (COHb) or methemoglobin (MeHb). At one time, we defined outpatient and emergency department ABGs to include the above named studies (which are determined by co-oximetry). In 1999, HCFA's decision to invalidate all but a select few "approved" laboratory panels led to the demise of the former approach to blood gas analysis. [1] **Carboxyhemoglobin** (or **carbon monoxide - CO**) and **methemoglobin** may be ordered as single tests (on either arterial or venous blood). Alternatively a **co-oximeter ("Co-ox") study** can be ordered to provide both tests.

Over the years, we have detected occasional cases of unsuspected carbon monoxide poisoning. This diagnosis should be considered when evaluating patients with unexplained headache, dyspnea, chest pain, tachycardia, vomiting or fatigue – particularly if there is a history of recent exposure to a gas furnace, space heater, fireplace fire or paint stripping (methyl chloride). The half-life of CO is between 180 – 200 minutes if breathing room air and 45 – 80 minutes if breathing 100% oxygen. Hyperbaric oxygen treatment (Duke Divers Alert Network Center: 919-684-8111) should be considered in patients with COHb ≥ 20% and/or symptomatic poisoning (history of unconsciousness, confusion, arrhythmias, nausea, vomiting or cardiovascular decompensation). [2]

John D. Benson, MD

1. Benson JD *et al*. Discontinuation of Selected Chemistry Profiles. *Rex Lab Bulletin*, no. 41, Sept. 1999.

2. Mitchell, PR. Carbon Monoxide Poisoning. *N C Medical Journal* 49:292-295, 1988.

CHANGES IN THE PTT

On Thursday, March 1, 2001 Rex Hospital Lab will change to a new activated partial thromboplastin (aPTT) reagent. The new reagent is more sensitive and is designed to uncover a lupus anticoagulant. The new reagent causes slightly shorter aPTT times. The unfractionated heparin therapeutic range and normal values will change on all lab result sheets and in the computer on the date of implementation. Also, the heparin sliding scale protocol ("Heparin Drip Orders") will reflect the changes. The new times are summarized below and contrasted with the current normal and therapeutic values:

	Before March 1, 2001	Beginning March 1, 2001
aPTT		
Normal Range:	27 to 36 seconds	24 to 35 seconds
Therapeutic Range	50 to 77 seconds	43 to 72 seconds

The therapeutic range for unfractionated heparin is based on 1.5 to 2.5 times the normal mean aPTT and is derived from the heparin curve that assumes therapeutic heparin levels of 0.2 to 0.4 u/ml.

Stephen V. Chiavetta, MD
Elaine Patterson, MT. ASCP

Lupus Anti-coagulant Quiz

Directions: Choose the one best answer. Answers follow below.

1. Lupus anticoagulants are associated with
   a. bleeding
   b. thrombosis
   c. low platelet counts
   d. Increase in fibrin split products

2. A circulating Lupus anticoagulant will result in
   a. A prolonged prothrombin time (PT)
   b. A prolonged activated partial thromboplastin time (aPTT)

c. Prolonged thrombin clotting time (TCT)
d. Low activated factor Xa assay

3. Lupus anticoagulants are antibodies that are active against
   a. cardiolipids
   b. factor X
   c. heparin
   d. phospholipids

4. A prolonged aPTT may be caused by
   a. lupus anticoagulant
   b. hematocrit greater than 55% or underdrawn tube
   c. factor XII deficiency (Hageman factor)
   d. all of the above

5. After evidence of an inhibitor has been established (no correction of the aPTT with normal plasma) the most commonly used test to determine a phospholipid-dependent anticoagulant is:
   a. Factor Xa assay
   b. Thromboplastin generation test
   c. Dilute viper venom test
   d. Thrombin clotting time (TCT)

Answer 1 (b)
Lupus anticoagulants are often associated with arterial and venous thrombosis. The presence of lupus anticoagulants is increasingly associated with a variety of hemostatic problems such as unexplained thrombosis, recurrent fetal loss, thrombocytopenia, neurological disorders, antiphospholipid syndrome and acquired immunodeficiency syndrome (AIDS). They are also associated with the administration of certain drugs such as chlorpromazine, procainamide or penicillin derivatives.

Answer 2 (b)
Lupus anticoagulants are usually uncovered because of a prolonged aPTT in conjunction with a normal PT. However, in those patients with a prolonged PT caused by a lupus anticoagulant, the INR (international normalized ratio) is not reliable to accurately monitor coumadin therapy. In these patients monitoring the Factor Xa (activated factor ten) assay is preferred. For those with a normal baseline PT, the INR is probably sufficient to monitor coumadin therapy. However, a normal baseline PT will not guarantee that the INR will be accurate in every patient. This problem can be avoided by using low molecular weight heparin instead of coumadin.

Answer 3 (d)
The detection of a lupus anticoagulant usually occurs incidentally when an aPTT is ordered. Lupus anticoagulants are antibodies (IgG and IgM) that prolong phospholipid dependent clotting assays. Not all reagents used in the aPTT are sensitive enough to detect a lupus anticoagulant. The amount of phospholipid must be small enough so as not to overcome the in vitro anticoagulant activity of the lupus anticoagulant. The recent change in aPTT reagent at Rex Lab will permit detection of most lupus anticoagulants. However, if a laboratory uses an aPTT reagent that is high in phospholipid concentration, a prolongation of the aPTT may not be seen. The prothrombin time (PT) is usually not prolonged is because the phospholipid

concentration in the PT reagent is so high that it overwhelms the antibody.

Answer 4(d)
If the hematocrit is greater than 55% or if an insufficient volume of blood is drawn in the tube, the plasma will have an excess of anticoagulant. The relative excess sodium citrate in the tube binds calcium and prolongs the aPTT. Factor XII (Hageman factor) does not cause bleeding but prolongs the aPTT. Lupus anticoagulants also prolong the aPTT. Both lupus anticoagulants and Hageman factor deficiency are associated with increase incidence of thrombosis.

Answer 5 (c)
The dilute viper venom test has two parts; a screen and confirmatory test. The screen uses a low concentration of phospholipid, resulting in a prolonged result in the presence of a lupus anticoagulant. Prolongation in the screen can also occur due to heparin, coumadin or decreased levels of factors V or X. A confirmatory test uses a high concentration of phospholipid, which should result in shortened times. The test result is reported as a ratio. If the ratio is greater than the established normal, the patient is positive for a lupus anticoagulant. **The lupus anticoagulant test performed at Rex includes both parts. The test must be ordered by the physician who wishes to follow up an abnormal aPTT. A single blue top (citrate) tube is required.**

Stephen V. Chiavetta, MD

References
S. Chiavetta, MD; Lupus Anticoagulants: Not necessarily Lupus and not really an anticoagulant. Rex Healthcare Laboratory Bulletin, Issue 38, May 1999, page 1.

Donna Castellone, MT ASCP, Identifying Lupus Anticoagulant, Laboratory Medicine Number 2, vol. 32, February 2001, page 7

For further information, call the Laboratory (784-3040). Telephone extensions are: Pathologists' Direct Line (3201), Sharon Logue (Lab Director 2400), Robin Ivosic (Core Lab Manager 3053), Elaine Patterson (Core Lab Manager 3054), Jackie Okoth (Core Lab PM Manager 4248), Diane Young (Anatomic Pathology Manager 3888), Nga Moore (Customer Service Manager 3396), Kori Horsley (Customer Service PM Manager 4340).