Exercise 2  

Donor Physical Exam

Textbook:

Skills: 20 points

Objectives

1. For each of the following state the acceptable values for blood donation using appropriate units:
   a. Pulse
   b. Temperature (Celsius and Fahrenheit)
   c. Weight
   d. Hemoglobin, for both autologous and allogeneic donations
   e. Hematocrit, both autologous and allogeneic donations
2. Describe the appearance of an acceptable blood collection site.
3. Describe the appearance of a site that is unacceptable for blood collection.
4. State the principle of the copper sulfate screening procedure for hemoglobin.
5. State the purpose for obtaining informed consent from the blood donor.
7. List the advice which must be given to donors concerning post-phlebotomy activities.
8. Given results of a blood donor’s physical exam evaluate the results and determine whether or not the donor is eligible to donate and defend your decision.

Discussion

A limited physical examination along with a rather detailed medical history must be done on the day of and prior to each blood donation to determine whether giving blood will in any way harm the donor or if transfusion of the donor unit will in any way harm the recipient. In the previous laboratory exercise the potential donor was interviewed and deferrals were made for a variety of reasons, most of which were made to protect the potential recipient of blood. In today's exercise a limited physical examination will be performed on the potential donor to ensure that the donation of a unit of blood will in no way affect the donors current health status.

Principle

The health status of the potential donor is evaluated based on the following parameters:

Weight – donor must weigh at least 110 lbs. Donors are not actually weighed, just asked if they weigh at least 110 lbs. Donors who weigh less may be drawn, but the volume of blood drawn must be calculated and the amount of anticoagulant in the blood bag must be reduced accordingly. This is rarely done except in very unusual circumstances.

Temperature – must not exceed 99.5 F or 37.5 C

Pulse – should be between 50 - 100 beats per minute with no pathologic irregularity. Lower rates are acceptable from prospective donors who have high exercise tolerance. High pulse rates and/or irregularities in the pulse beat may indicate an undiagnosed disease condition. The donor should be deferred and instructed to see their physician.
**Blood pressure** – systolic no higher than 180 mm Hg and diastolic no higher than 100 mm Hg. Patients with high blood pressure are at an increased risk of having heart attacks or strokes. They should be advised to see their physician as soon as possible. High blood pressure is very treatable and may prevent future health problems once controlled.

**Hemoglobin** – Hemoglobin must be 12.5 g/dL or greater for allogeneic donations or 11.0 g/dL for autologous donations. Hemoglobin is the substance in red blood cells which carries oxygen to the tissues. A low concentration of hemoglobin indicates anemia in the potential donor. Many female donors will often have to be deferred due to a slightly low hemoglobin. Women lose blood each month due to menstruation. If their diet is not adequate to replace the lost iron (which is a major component) they may become slightly anemic. This is quickly remedied with a correction in diet or iron supplements. If the hemoglobin is very low this is indicative of some underlying condition which should be evaluated by their physician as soon as possible. The hemoglobin concentration is determined by adding the blood to a special solution and getting a reading from an instrument. This procedure has been covered in detail in the Hematology course.

A more common method used to determine hemoglobin concentration in the donor centers, especially the mobile units, is the **copper sulfate hemoglobin determination**. This is a qualitative screening test based on specific gravity. The density of the drop of blood is directly proportional to the amount of hemoglobin it contains. The principle of the test is that when the drop of donor's blood dropped into copper sulfate solution becomes encased in a sac of copper proteinate, which prevents any change in the specific gravity for about 15 seconds. If the hemoglobin is equal to or more than 12.5 gm/dL the drop will sink within 15 seconds and the donor is accepted. If the blood drop sinks to the middle and remains or starts to rise the donor is deferred. This is **not** a quantitative test and will only show that the hemoglobin is equal to, below, or above acceptable limits. Test results that indicate satisfactory hemoglobin levels are usually accurate, but some results that indicate low hemoglobin levels are false. Repeating the test by a second method will help resolve this problem. *The specific gravity of the copper sulfate solution is 1.053, must be kept tightly capped to prevent evaporation which will affect the specific gravity, must be changed daily or after 25 tests.*

**Hematocrit** – whole blood is made up of plasma and red blood cells. *The hematocrit value is the percentage of red blood cells present in the whole blood.* Low hematocrit values are indicative of anemia in the potential donor (as outlined above). The procedure involves filling capillary tubes with donor blood and spinning them down in a microhematocrit centrifuge. The tubes are then placed on a device to determine the percentage of red blood cells. The hematocrit must be 38% or more for allogeneic donations or 33% or more for autologous donations. Potential donors with low values are deferred and should be referred to their physician if the hematocrit is very low.

**Venipuncture site** – the skin at the site of venipuncture must be free of lesions. Check both arms for signs of IV drug abuse which would be indicated by track marks.

After the donor has been evaluated and passes both the medical history and physical examination the unit of blood may be drawn.
Written informed consent - must be obtained from the donor. The consent should include a statement informing the donor about the infectious diseases for which the blood will be tested, a statement of what will happen if the blood is found positive in a laboratory test, that they understand the risks of blood donation and their questions have been answered, a statement that the donor is voluntarily donating their blood for use by the blood center and that the donor has provided a true and accurate medical history.

Adverse Reactions - Donors must also be informed of the possible adverse reactions which may occur during or shortly after the donation process. This information is very helpful to donor room personnel in that the donor may recognize early on that a reaction is taking place and be treated sooner. Refer to your textbook and lecture guide for the list of adverse reactions to donation.

Post-Phlebotomy Activity - Donors must also be informed about post-phlebotomy activity and care such as drinking more fluids in the next 4 hours, refrain from smoking for one half hour, what to do if dizziness occurs, how to take care of the phlebotomy site, what activities to refrain from and to eat a healthy meal following donation. With adequate fluid intake, complete blood volume restoration should take less that 12 hours.
Instructions

Reagents/Supplies

1. Finger stick procedure and supplies
   a. Microhematocrit tubes
   b. Clay
   c. Lancet
   d. Alcohol swab
   e. Biowipe (to wipe off first drop of blood)
   f. Microhematocrit centrifuge
2. Copper sulfate solution (if available)
3. Thermometer
4. Blood pressure cuff and stethoscope (if not available instructor will supply blood pressure values)

Procedure:

1. Properly perform fingerstick procedure as learned in “Intro to MLT.”
2. Properly fill two microhematocrit tubes approximately two thirds full of blood.
3. Allow one drop of blood from one of the microhematocrit tubes to fall into the copper sulfate solution.
4. Time it for 15 seconds. If it sinks, hemoglobin of donor is acceptable. If it remains suspended or floats to the top, hemoglobin is unacceptable and donor must be deferred unless hematocrit proves to be in an acceptable range.
5. After performance of the copper sulfate procedure place clay in one end of each microhematocrit tube in the end OPPOSITE of the red ring and spin in microhematocrit centrifuge for 5 minutes.
6. While microhematocrit tubes are spinning take donors temperature and pulse. **NOTE:** Never perform a fingerstick on a donor while the thermometer is in their mouth. Record results.
7. Take donors blood pressure (if equipment not available get values from instructor).
8. After microhematocrit tubes are ready read and record the results.
9. At the bottom of the sheet make your determination as to whether or not the donor is eligible to donate blood. If the answer is “not eligible” explain why.
10. **BASE YOUR EVALUATION OF ACCEPTABILITY ONLY ON THE PHYSICAL EXAM RESULTS.**
Donor Physical
Recording Results

1. Weight greater than 110 lbs.? (circle one) YES NO

2. Hemoglobin _________________________________
   Copper sulfate method result (circle one)
   a. drop sank
   b. remained suspended
   c. floated to top

3. Temperature______________________________

4. Pulse_______________________________

5. Blood pressure_______________________________

6. Appearance of skin at venipuncture site (circle one)
   a. free of lesions
   b. boils, open wounds or severe skin infections present
   c. IV drug tracks present

7. Hematocrit_______________________________

8. General appearance of donor (circle one)
   a. appears excessively nervous
   b. appears drunk or under influence of drugs
   c. appears ill
   d. appears ready to donate

CONCLUSIONS AS TO DONOR ELIGIBILITY:
Donor Physical Study Questions

Points: 13

Use the lab exercise, lecture guide and/or textbook to answer the following questions. Each response is worth 0.5 unless otherwise stated.

For each of the following parameters list the values which are considered acceptable for an allogeneic blood donor. *Answers must contain proper units to receive credit.*

1. Weight
2. Temperature (F and C)____
3. Pulse____
4. Blood pressure
   a. Systolic
   b. Diastolic
5. Hemoglobin
   a. allogeneic____
   b. autologous____
6. Hematocrit
   a. allogeneic____
   b. autologous____
7. Answer each of the following as it relates to the copper sulfate screening procedure for hemoglobin.
   a. Specific gravity of solution used-
   b. Number of times solution can be used -
   c. Principle of the test (1 point) -
   d. Describe 2 observations that indicate an unacceptable test (1 point)

8. Describe what should be looked for at the site chosen for performance of the phlebotomy. (1 point)

9. State 2 items which must be explained to the donor prior to obtaining written informed consent. (1 point)

10. List two possible adverse affects of blood donation. (2 points)

11. List three instructions to be given to the donor about post-phlebotomy activity. (1.5 points)