Blood Collection in Blood Bank (Phlebotomy)

Ajit Pal Singh
Assistant Professor
Department of Medical Lab Technology
Sharda University, Greater Noida, U.P., India

Abstract— If any one needs blood for transfusion, he must have blood donors. There is as yet no acceptable alternative source of blood. We must obtain blood from living and healthy blood donors, who may be relatives of the patients needing blood. There are generally two types of preferred donation one is relatives and other is volunteer blood donors. Some times many NGO's organize blood donation camps, but still the need of blood is high. Mostly healthy people can donate blood without any ill effects. There are certain things which would make a donor unsuitable, however, and in order to keep blood as a safe and harmless procedure, we must screen our donors to be sure they are suitable for donation. There are two basic principles behind all donor screening, 1) The donation must be safe and harmless to the donor, 2) The blood donated must not be harmful to the patients who will receive it, and should be helpful to the recipient.

Keywords: Phlebotomy, Donation, Blood, Transfusion, Donor, Blood bank

I. INTRODUCTION

An important step to ensure good quality blood component to the patients is to collect blood in least aseptic conditions as possible. Staff should be adequately trained for collection of blood which should be under the supervision of the consultant of the department of transfusion medicine or under a medical officer. The donor should be courteously greeted in side the phlebotomy. Ask the donor politely to either switch off or leave the mobile phone outside.

A. Materials required

1) Donor couch.
2) Bio-mixer.
3) Stethoscope.
4) Syphnomanometer
5) Donor registration number stickers.
6) Blood Bags [According to the weight and the components to be made].
7) Test Tubes.
8) Stripper.
9) Blood Bank Refrigerator.
10) Needle destroyer.
11) Plastic container with hypochlorite [For sharp disposal].

B. Others

1) Artery Forceps.
2) Chital Forceps.
3) Scissors.
4) Medium sized cotton balls (Sterilized).
5) Gauze (Sterilized).
6) Disposable Gloves.
7) Dressing Drums.
8) Adhesive tapes.
9) Denatured Spirit.
10) Betadine.
11) Tincture Iodine.
12) Sterillium.
13) Emesis Basins
14) Towel.
15) Blanket

C. Emergency supplies and medicine

1) Emergency trolley and tray.
2) Oxygen trolley with mask/nasal tubes.
3) Disposable syringes.
4) Injection Avil.
5) Injection Adrenaline.
6) Injection Atropine.
7) Injection Noradrenaline.
8) Injection Calcium Gluconate.
9) Injection Sodium Bi Carbonate.
10) Injection Hydrocortisone.
11) Injection Perinorm.
12) Tongue Depressor.
13) Normal Saline.
14) Dextrose 5%, 10%.
15) I/V Set with Cannula.

II. PROCEDURE:

A. Preparation of Blood Bag for Blood Collection:

1) The blood bag to be used for collection of whole blood should be based on the donor's weight and the type of component to be made.
2) Each blood bag should be inspected and looked for:
– Date of expiry.
– Any leakages.
– Any contamination inside the bag.
3) Write the donor number and the date of donation with a permanent marker on the Right side of the primary and the satellite bags.
4) Affix Specific identical donor registration numbers on the right side of the donor card, the primary bag and its satellite bags on the right-side bottom of the bags.
5) Mention the segment number in the space provided on the right side of the donor form.[1]

B. Procedure for Vein selection:

1) Make the donor lie on the donor couch.
2) Try and make a rapport with the donor and allay any fear or doubt in his/her mind.
3) Apply the cuff of sphygmomanometer just above the cubital fossa and inflate to 60-70 mm Hg. Give a squeezing ball to the donor so that he grips it tightly, which usually helps to bring the veins in prominence.
4) Inspect the anti-cubital area, select a good caliber firm vein. Palpate and examine the selected vein.
5) Release the pressure of the cuff and prepare the venipuncture site.[1]

C. Venepuncture Site Preparation:

1) Take a spirit swab and scrub an area of about 5 centimeters in a concentric spiral manner from the central to periphery with a spirit swab.
2) Take another swab of Betadine/Iodine and scrub the area in the same manner, and leave it to dry for 30 seconds and then exactly in the same manner taking another swab of spirit scrub the area and allow it to dry, be very sure that the area is thoroughly cleaned from the skin as it is a strong irritant.
3) If you have disposable gloves donned then well and good and if not then clean your hands with Sterillium provided in the phlebotomy area.
4) Cover the scrubbed area with sterile swab until venepuncture.[1]

D. Procedure for Venepuncture:

1) Before proceeding for the venepuncture:
– Check ID number on the bag and the donor card.
– Cross check the segment number on tubing of the bag and the donor card.
– Verify and check the particulars with those given on the donor card.
– Check if the donor has signed in the place for his consent.
2) Program the Bio-Mixer for the amount of blood to be drawn.
3) Place the bag on the Bio-Mixer and pass the tubing through the automated clamp.
4) Raise the pressure of the sphygmomanometer cuff to about 70mm of Hg to make the vein prominent.
5) Make a loose knot leaving about 2 inches from the needle.
6) Clamp the tubing of the blood bag with the plastic clamp or artery forceps near the and then only remove the needle cap to prevent any air entry into the bag.
7) Introduce the needle into the vein, immediately remove the clamp and also reduce the pressure of the sphygmomanometer to 40-50mm of Hg so that there is free flow of blood into the bag.
8) Fix the needle by fixing adhesive tape on the hub of the needle and if needed on the tubing also of the bag.
9) Cover the phlebotomy site with a sterile swab.
10) Ask the donor to open and close his/her hands by squeezing the rubber balls provided so that a continuous good flow of blood is maintained.
11) Affix specific donor number slips which was affixed on the donor card on three test tubes to be used for sample collection from the donor.
12) Time taken for collecting a unit of blood should not exceed 15 minutes (450ml bag capacity) and if the collection time is more then the stipulated time then the bag should not be processed for making components.
13) Monitor the volume being drawn.
– 350 ml of blood is collected from donors who weight less then 60 kgs and more then 45 kgs.
– 450 ml of blood is collected from donors who weight more then 60 kgs.
– The volume of the blood to be drawn can also be inferred indirectly by weighing the blood bag using a pan weighing pan. The factor to convert blood volume to weight is 1.05 that is 1ml of blood is equal to 1.05 gm of blood.
Thus, accordingly the following formula can be used to calculate the amount of blood to be collected in 350ml or 450 ml capacity of blood bag.
Total weight of the bag = (350/450 × 1.05) + weight of empty blood bag.
14) Once the desired amount is collected, tighten the knot in the tubing and clamp the tubing in front of the knot leaving adequate space with the help of artery forceps and then with the help of scissors to separate the bag.
15) Collect sample in the pre-labelled pilot tubes from the donor directly.
16) Strip the tubing so as to mix the blood of the tube with the blood in the bag thus we can have anti-coagulated blood in the segments that we would make to be used in compatibility testing.
17) Use the needle destroyer to blunt the needle and then dispose it safely in a plastic container with Hypochlorite solution which would be later send for incineration.
18) Single blood bags and bags from which platelets are not to be made are to be kept at 4-6° C immediately and the once from which platelets have to be made, they are kept at room temperature.
19) check and apply band-aid at the venepuncture site if there is no bleeding.[2]

Thanks, the donor for the contribution made and direct him to the refreshment area if his feeling fine. Watch him for a period of 10-15 minutes and then after giving him post donation advice he may be then allowed to leave the blood bank.

E. Post Donation advice:

Each donor has to be given the following general advice after donation:

– Drink more fluids than the usual in the next few hours.
– In case the donor experiences dizziness or has faintness tell them that they should lie down immediately with both legs raised.
– In case of bleeding from the site of venepuncture apply pressure over the bleeding site with fingers until the bleeding stops, and if it does not stop then contact the blood bank
– They should avoid strenuous physical work for the next 24 hours.
– Avoid smoking, consumption of alcohol and tobacco for a few hours after donation.
– Have your normal meals.
– Band aid can be removed after 10-12 hours of donation.[2]

III. DONOR REACTIONS

Majority of the donations proceed without any complications to the donor, but sometimes a donor may experience some kind of an adverse reaction due to donation. The majority of the reactions that are seen are the vasovagal reactions.
The reactions may be due to:

A. Psychologic Influences d/t (-) Sight of blood.

(-) Fear.

(-) Excitement.
(-) Apprehension.

B. Neuro-Physiologic response to actual donation.

The reactions based on the severity can be divided into mild, moderate and sever reactions. Following are the reactions signs and symptoms based on the severity and the steps that should be taken for their management:[3]

IV. MILD REACTIONS:

This is the most common type of reaction in which the donor has signs of shock but is conscious. One or more signs and symptoms may be present which are as follows:

- Nervousness and anxiety.
- Pallor, sweating, felling warm.
- Nausea and may be vomiting.
- Increased respiration.
- Increased or thready pulse.
- Blood pressure would be decreased.[4]

A. Management:

- Stop the donation and remove the needle (if in the process of donation).
- The head end of the couch is lowered and leg end raised.
- Loosen any tight clothing's in particular around the neck.
- Tell the donor to breath normally to avoid washing out of carbon dioxide or the donor can be asked to breath in a paper bag to counteract the effect of hyperventilation.
- Ensure the donor has a clean airway and if he is vomiting put his head to one side to avoid aspiration.
- Apply a cold towel to the forehead and neck.
- Keep on talking to the donor, reassure the donor to reduce his stress, anxiety or both.
- At NO time the donor should be left alone. [2]

V. MODERATE REACTIONS:

The donor experiences the signs and symptoms similar to that found in mild reactions plus the donor loses his consciousness. The following signs and symptoms are in addition to the ones found in the mild reactions.

- Unconsciousness or repetitive periods of unconsciousness could be there.
- Rapid shallow respiration and hyperventilation.
- Decreased pulse rate.
- Continued decrease in the blood pressure.[4]

A. Management:

- Take the appropriate measured as been taken for the mild reactions.
- Check the vitals until they return to normal.
- Separate the donor by use of screen as sight of reaction may trigger reaction in others.
- If necessary, administer 95% oxygen; 5% carbon dioxide.[3]

VI. SEVER REACTIONS:

Apart from the signs and symptoms of mild and moderate reactions the donor tends to have convulsions. The following may occur one after the other slowly where distinction can be made or rapidly where distinction can not be made for the various signs and symptoms.

- The donor does not loose consciousness but may complain of stiffness or tingling in the fingers.
- Spasm may occur in the extremities.
- Short lapse of consciousness.
- Fading of voice.
- Slight involuntary movements of arms and legs.
- Body then becomes rigid and teeth clenched.
- There could be temporary loss of breathing which is then followed by rasping and stertorous type of breathing.[3]

A. Management:

One of the most important things is that the person attending the donor has to remain calm and should not alarm the other donors. Management has to be done in accordance with the above-mentioned signs and symptoms in a step wise manner:

- Tell the donor to breath in a normal manner and should not inhale and exhale fast, if required tell him to breath in a paper bag.
- Do not leave the donor and call for more assistance.
- Lower the head end and raise the leg end.
- Restrain the donor from injuring himself.
- Ensure adequate airway.
- If necessary, administer 95% oxygen and 5% carbon dioxide.
- Observe the donor until fully recovered, check the vitals and then only allow the donor to leave the blood bank.[4]

VII. OTHER REACTIONS:

A. Hematomas:

- Remove the needle after decreasing the cuff pressure.
- Apply pressure to the venepuncture site and if necessary, raise the arm for 5 to 10 minutes.
- When the bleeding has completely stopped then apply a bandage.
- If the arm is stiff or sore then apply ice pack over the dressing.
- The donor should see his/her family doctor if the arm becomes painful or come back to the blood center.

B. Cardiac and/ or Respiratory problems:

If the donor develops respiratory difficulties or appears to be having cardiac problems call for medical assistance immediately.[2]

VIII. POST DONATION INSTRUCTIONS

- Leave band-aid in place for at least 4 hours and not to let it wet.
- Avoid lifting or heavy exercise for at least 24 hours
- Increase fluid intake for 48 hours
- Avoid driving for next two hours
- Do not smoke or chew tobacco for two hours after donation
- Avoid alcohol for next 24 hours
- Inform a blood bank staff member if you have any unexpected reaction – lightheadedness, nervousness, flushed look or slight perspiration above the lip

- If there is bleeding from the site where the needle was placed, raise your arm and apply pressure on the bandage until it stops.
- If you have any question, ask from blood bank staff before leaving
- For any persistent problem, contact blood bank [3]

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