Skills required in phlebotomy

Objectives

1. To acquire the knowledge and skills to perform phlebotomy and finger prick.
2. To learn the order of draw and its significance.
3. To learn various devices and preparation techniques before phlebotomy.

Introduction

Phlebotomy is referred to the cutting of a vein. It is a procedure often involving invasion that invades the body through cutting or puncture normally carried out by professionals called phlebotomists. Among the major roles involving a phlebotomist is to obtain blood specimens for diagnostic testing. This can be done either by dermal puncture which is done by puncturing the skin or venepuncture which is done by puncturing the veins. Other than that, a phlebotomist is also responsible in redrawing blood from donors during blood transfusion of from any patients having polycythemia which is known for overproduction of blood cells. Phlebotomist are also responsible for collecting and properly packaging urine specimens, accepting incoming specimens (blood and body fluids, etc.), and routing specimens to the proper departments to be tested and analysed. In order for a phlebotomist to withdraw blood from a patient, he should make sure that the tubes are labelled and all the materials are prepared before carrying out the procedure. The best sites for venipunture are normally the superficial veins of the upper limbs. The superficial vein most commonly used for venipuncture is the median Cubital Vein which lies over the cubital fossa and serves as an anastomosis between the basilica veins and the cephalic veins.

The next most common vein is the cephalic vein where it can be followed proximally where it empties into the axillary vein. The basilic vein is also a location for venipunture as it divides to join the brachial vein. The usual sites for capillary puncture or finer prick in adults and children are the fingertip. In adults, the ring finger is often selected because it usually is not calloused. Capillary blood can be obtained from the great toe in infants and babies. In new-borns, the lateral or side portion of the end of the heel pas is used.

The BD

Discussion

Among the inappropriate sites for venipuncture are the site affected by a mastectomy. This is because mastectomy causes lymphostasis which means stoppage of lymph flow where the body’s ability to fight infection is compromised if lymph nodes are removed therefore patients are more prone to infections. Edematous sites, an abnormal accumulation of fluid on the intracellular space of the tissue must also be avoided as it can cause difficulty in palpating the veins due to the excess fluid. The specimen can also be contaminated with the fluid. Venipuncture performed at sites of scars and burns are also inappropriate as it causes unusual pain for the patients. This is caused by the veins that are very difficult to palpate and also susceptible to infections as the protective barrier (epidermal layer) has been disrupted. Other than that, patients who have IV running in their arm should not be used for venepuncture as it may be a contaminant to the blood collected. Lastly, dermal punctures must never be performed on the fingers of a new-born or very young infant. This is because there is very little

distance between the skin and the bone. Therefore, the bone could be easily pierced during the puncture, causing injury to the bone, infection, or gangrene.

The order of draw is as follows,

1. Blood Cultures
2. Coagulation Tube (light blue top)
3. Plain red AND/OR Serum Separator Tube (red gel/SST)
4. Heparin Tube (green top)
    1. Plain Sodium Heparin
    2. Plain Lithium Heparin
    3. Lithium Heparin Gel
5. EDTA Tube (purple and pink top)
6. Fluoride/ Oxalate Tube (grey top)
7. Miscellaneous tubes (these are drawn in no specific order)
    1. Heavy metal dark blue top (EDTA and plain red)
    2. b. ACD yellow top

The purpose of the order of draw is to avoid possible test result error due to cross contamination from tube additives. Potassium results can be falsely elevated as EDTA is rich in potassium. Therefore test for potassium must be collected before tubes containing EDTA. Other than that, the microscopic appearance of the red blood cells on a WBC differential test will be distorted due to the additives in the Fluoride/ Oxalate tube as oxalate interferes the red blood cell membrane and fluoride alter its morphology. Moreover, coagulation tests such as Activated partial thromboplastic time (aPTT) and

prothrombin (PT) can be affected with the presence of clot activators by shortened test results. Bacteria from non-sterile tube stoppers/shields can contaminate blood collected into bottles/tubes used for blood cultures, resulting in the growth of bacteria erroneously leading a physician to think his/her patient has a blood infection.

A hematoma is a collection of blood beneath the skin. Hematomas are the most common adverse reaction to venipuncture. Precautions that can be taken to prevent hematoma in phlebotomy are by puncturing only the uppermost wall of the vein. Other than that, the phlebotomist can also remove the tourniquet before removing the needle. The needle should fully penetrate the upper-most wall of the vein as partial penetration may allow blood to leak into the tissue surrounding the vein. Lastly, adequate pressure should be applied to stop the bleeding once the phlebotomy is complete.

Haemolysed blood specimens are not be acceptable for testing. Hemolysis occurs when the red cells rupture and haemoglobin and other intracellular components spill into the serum. Hemolyzed serum or plasma is pink or red, rather than the normal clear straw or pale yellow colour. Steps that can prevent haemolysis are by mixing tubes gently or about 5 – 10 times after collection. The tubes should not be shaken too vigorously and drawing blood should be performed on hematoma individuals. Other than that, when using a needle or syringe, avoid drawing back the plunger to forcefully. Moreover, if a blood transfer device is used to fill vacutainer tubes, always allow the vacuum to pull the blood into the tubes. Do not use he plunger or syringe to force the blood into the tubes quickly.

References

1. Akron Children’s Hospital, 2015, Lab Test Procedure : Performing A Venipuncture. [Online]. Available at : https://www. akronchildrens. org/cms/lab_procedures/9179c8cb8f877ee3/[Accessed 29/01/2015].
2. Johnson. L, 2013, National Center for Competency Testing : Phlebotomy order of draw, [Online]. Available at : https://www. ncctinc. com/documents/Phlebotomy%20Order%20of%20Draw. pdf[Accessed 29/01/2015].
3. MediaLab incorporated, 2015, Hematoma, [Online]. Available at : https://www. medialabinc. net/spg549505/hematoma. aspx, [Accessed 29/01/2015].
4. Turgeon., M,. L, 2005, Clinical Hematology: Theory and Procedures, Volume 936, [Online], Available at : https://books. google. com. my/books? id= cHAjsUgegpQC&pg= PA26&lpg= PA26&dq= edematous+site+venipuncture&source= bl&ots= qxLCqzHsO2&sig= OaKkj33lflGKFvorZweYFnb4RHU&hl= en&sa= X&ei= n1bHVI-VM4yD8gW29IKoBg&ved= 0CDIQ6AEwAw#v= onepage&q= edematous%20site%20venipuncture&f= false, [Accessed 29/01/2015]