Akal College of Nursing

Baru Sahib

Class Summary

**Date**: 11/12/15

**Time:** 2pm to 3pm

**Class** B.Sc. Nursing IInd Year

**Subject:** Pathology

**Unit:** Clinical Pathology

**Topics:** Methods of collection of blood specimen for various clinical pathology, biochemistry, and microbiology tests

**Introduction**

**The sections include:**

* Clinical pathology
* Hematology
* Clinical biochemistry
* Clinical microbiology
* Serology
* Blood bank
* Histology and cytology

**Clinical biochemistry:**

It deals with the applications of biochemistry laboratory to find out the cause of a disease.

**Types of samples that are used in testing:**

Body fluids: blood, serum, plasma, urine, cerebrospinal fluid (CSF), feces, and other body fluids or tissues.

**Biochemical tests in clinical medicine**

* Lipid profile
* Diabetic profile
* Kidney profile
* Liver profile
* Bone profile
* Electrolyte profile

**Lab request and lab report forms**

**Lab request form:** it fills computerize or paper filled by the doctor then send it to the lab. The lab request contains a list of tests to be performed on specimen of patient. Each lab has its specific request; for example, chemistry request, hematology request… etc.

**Lab report form:** it contains the result of patient.

**Laboratory work flow cycle:**

The flow cycle includes the entire steps of laboratory test, starting from test ordering by a doctor until reporting the results.

Three phases of laboratory testing:

**Pre-analytical:** test ordering, specimen collection, transport and processing

**Analytical-testing**

**Post-analytical:** testing results transmission, interpretation, follow-up, retesting.

**Phlebotomy**

**Phlebotomy or blood collection:**

The term phlebotomy refers to blood draw from a vein, artery, or the capillary bed for lab analysis or blood transfusion.

**The phlebotomy equipments:**

For specimen collection, the following materials will be required:

* **Selecting vein site**

**Usually vein** is used to collect blood by **veinpuncture procedure.**

In adults: most venipuncture procedure use arm vein.

**On arm, one of three arm veins is used: median cubital vein "**located on the middle**", cephalic vein or basilic vein** "located on both sides".

**Median cubital vein is the best choice (why?)** because it has good blood flow than cephalic and basilica which has slower blood flow.

However if veinpuncture procedure is unsuccessful in median capital; cephalic or basilica is used.

**Artery blood is rarely used in special cases as when blood gases, pH, PCO2, PO2 and bicarbonate is requested. It is usually performed by physicians.**

**Preparation of Blood Sample**

One of three different specimens may be used:

* **whole blood**
* **serum**
* **plasma**

**First: Whole-blood specimen:**

**It must be analyzed within limited time (why?)**

* + Over time, cells will lyse in whole-blood which will change the conc. of some analytes as potassium, phosphate and lactate dehydrogenase.
  + Some cellular metabolic processes will continuo which will alter analytes conc. like glucose and lactate.
* Serum

**Second Serum:**

**Difference between Serum and plasma:**

* Serum is the same as plasma except it doesn't contain clotting factors (as fibrin).
* Plasma contains all clotting factors.
* So, serum and plasma all has the same contents of electrolytes, enzymes proteins, hormones except clotting factors
* Serum is mainly use in chemistry lab & serology.

**Procedure of Serum preparation**

* Draw blood from patient. Select vacutainer with no anticoagulant.
* Allow to stand for 20-30min for clot formation.
* Centrifuge the sample to speed separation and affect a greater packing of cells. Clot and cells will separate from clean serum and settle to the bottom of the vessel.
* The supernatant is the serum which can be now collected by
* Dropper or pipette for testing purposes or stored (-20°C to -80°C) for subsequent analysis or use.
* Plasma

**Third Plasma:**

* The tube will have anti-coagulation
* After centrifugation the blood sample got

separated into three layers

**Procedure of plasma preparation**

* Draw blood from patient. Select vacutainer with an appropriate anticoagulant.
* Mix well with anticoagulant.
* Allow to stand for 10min.
* Centrifuge the sample to speed separation and affect a greater packing of cells.
* The supernatant is the plasma which can be now collected for testing
* Purposes or stored (-20°C to -80°C) for subsequent analysis or use.

**Specimen rejection criteria:**

* Specimen improperly labeled or unlabeled
* Specimen improperly collected or preserved
* Specimen submitted without properly completed request form
* Hemolyzed sample (show tubes)
* **Hemolysis**

**Hemolysis :**

* It means liberation of hemoglobin due to rupture of RBCs.
* Due to hemolysis plasma or serum appears pink to red color.
* It causes elevation in: K+, Ca2+, phosphate, SGOT, SLDH and acid phosphatase.
* Hemolysis is occurred due to sampling, transporting and storage (too hot or too cold).
* According to the degree of hemolysis it is classified as H+, H++ and H+++. H+ may be accepted for some tests that are not affected by RBCs contents as glucose and lactate, H++ and H+++ not acceptable for any test.

**Changes in the serum color indicate one of the following:**

* **Hemolyzed**: serum appears **pink** to red due to rupture of RBCs
* **Icteric**: serum appears **yellow** due to high bilirubin.
* **Lipemic**: serum appears milky or turbid due to high lipid.

***Blood collection tubes:***

**Two major types of blood collecting tubes:**

* Serum separating tubes (SST)
* Plasma separating tubes (PST)

Submitted by

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