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Aquaintance of sample collection -Must for patient care

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Introduction:

Pre-analytical procedures are a common source of error in laboratory diagnoses that arise during patient preparation, sample collection, sample transfer, and sample storage. Although it has been reported that the pre-analytical phase is error-prone, it has recently been shown that a lot of errors occur in the 'pre-analytical phase' where the initial procedures of the testing process are performed by health care professionals in outside the direct control of a clinical laboratory that is a phlebotomist who collects blood from patients.

In the current scenario the continuity of quality in laboratory medicine is their emphasis on the performance and effectiveness of the analysis processes [1]. Although recent evidence suggests that many errors are actually found outside the analytical stage which is the forward and post-analytical stage. These stages are found to be more subtle than the risk of error [2]. Therefore our learning needs to be updated for all pre-analytic variables.

Commonly reported types of pre-analytical error are missing sample or test request, incorrect or missing identification, infusion contamination, hemolyzed samples, saturated and inadequate containers, unsuitable containers, unsuitable blood rate for anticoagulant and unstable carcass condition. and storage [3] The new update of CLSI guidelines for venous specimen collection focuses on further details of patient identification, specimen labeling, patient posture, collection from mastectomy patients, managerial use, adverse reactions, needle transplantation, anterior venous and anterior presentation. prevention of iatrogenic anemia.

Preffered venipuncture sites include the antecubital fossa and the back of the hand. Prioritization for the antecubital veins are as follows **A**. Veins in the median aspect center of the arm **B**. Veins in the lateral aspect outer thumb side that is cephalic vein **C.** Veins in the medial aspect inner little finger side that is basilic vein. Tourniquet application must not exceed one minute before accessing the vein to prevent hemoconcentration . Because of the prevalence of Methicillin resistant staphylococcus aureus and other pathogens on previously used tourniquets, single-use tourniquets are recommended to prevent the spread of healthcare-acquire infections.While 70% isopropyl alcohol is still the recommended antiseptic of choice, the procedure that has to follow is "cleanse the site with friction" not using concentric circles from inside to outside. Studies suggest that the friction scrub with movement back and forth is superior to concentric circular cleaning. The site must be allowed to air dry before performing the venipuncture. Once the site is cleaned, if it is necessary to repalpate the site, the gloved finger must also be cleaned with alcohol in order to not contaminate the site. The needle insertion is the site one inches below, not above the insertion site to reduce the risk of an accidental needlestick. The order of draw is to be

maintained whether the specimens are collected by evacuated tube method or by syringe and is also the same for plastic or glass tubes.

Order of draw is recommended due to the carryover from one tube to another. **A**. Blood culture tube (yellow with SPS) or blood culture bottles **B.** Sodium citrate tubes (light blue**) C**. Serum tubes non additive and additive tubes and gels (red,SST) **D.** Heparin tubes with or without gel (light green or dark green) **E**. EDTA tubes with or without gel (lavender, pearl white or pink) **F.** Sodium fluoride or potassium oxalate with antiglycolytic inhibitor (gray). Only blood cultures, glass non additive tubes or plastic tubes without clot activator may be collected before the coagulation tube light blue .Syringes must not be used for trace element collections that include testing for cobalt and chromium because the plunger tip contributes such elements to the specimen

Blood collection devices and their components like tube stoppers, tube walls, surfactants, clot activators, and separator gels may interfere with the endogenous analytes, extraneous materials, or bind blood components result in erroneous measurements of the elements[4]. Differences in posture standing, sitting, supine cause changes in plasma volume resulting in hemoconcentration from supine to sitting to standing, thereby increased analyte levels [5]. Using a too-thin needle may result in hemolysis, distorting results for hematological cell counts and potassium concentrations [6]. Prolonged use of a tourniquet results in hemoconcentration and changes in analyte concentrations [7]. Although mixing is recommended by manufacturers of collection tubes, a recent study showed that lack of mixing did not lead to clinically significant differences in analytes compared to mixing [8]. Hemolysis, icterus, and lipemia may result in spurious test results [9]. Inadequate filling will decrease blood to additive ratio, which may lead to inaccurate results [10]. Thus with awareness and the introduction of strategies to recognize preanalytical errors the goal of achieving total laboratory quality is finally within our grasp.

Hence laboratory physician and all laboratory personnel should be aware that spurious interferences may be present and that each laboratory is ultimately responsible for evaluating equipment and developing normal reference ranges. Careful evaluation of how specimens are collected, centrifuged, stored, and transported should be considered. Further, open communication between laboratory staff, laboratory physician,clinician should be pursued to ensure best patient outcomes, minimize unnecessary costs, limit the need to redraw patients, improve laboratory productivity, and decrease testing turnaround time.

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