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Acquaintance of Sample Collection -Must for Patient Care

Menka Kapil[1]*, Rateesh Sareen[2], G.N. Gupta[3]

Consultant Pathology[1, 3], Assistant Consultant[2]

Department of Pathology & Transfusion Medicine

Santokba Durlabhji Memorial Hospital & Research Centre, Jaipur, Rajasthan, India

***Corresponding Author's email id**: ggupta52@yahoo.com*

Abstract

The clinical laboratory plays an increasingly important role in the patient-centered approach to deliver healthcare services. Physicians rely on accurate laboratory test results for proper disease diagnosis and for guiding therapy; it is estimated that more than 70% of clinical decisions are based on information derived from laboratory test results. The total test process show that the pre-analytical phase accounts for 46% to 68.2% of errors. The awareness and knowledge to recognize preanalytical errors is the goal of achieving total laboratory quality is must for patient care.

***Keywords:** Pre analytic, Hemolysis, Lipemia*

INTRODUCTION

Pre-analytical steps are the commonest source of error in laboratory diagnostics which arise during patient preparation, sample collection, sample transportation and sample storage. Although it has been reported that the pre-analytical phase is error-prone, recently it has been demonstrated that most errors occur in the 'pre-pre-analytical phase' which comprises the initial procedures of the testing process performed by healthcare personnel outside the direct control of the clinical laboratory that is the phlebotomist who are drawing blood from patients.

At present scenario the perpetuation of quality in laboratory medicine have their focus on the performance and efficiency of analytical processes [1]. Although recent evidence suggests that most errors are actually seen outside the analytical phase that is the pre- and post-analytical phase .These phases are found to be more

vulnerable to the risk of error [2]. Thus our learning has to be updated for each step of pre analytical variables.

The most commonly reported types of preanalytical error are missing sample or test request, wrong or missing identification, contamination from infusion route, haemolysed, clotted, and insufficient samples, inappropriate containers, inappropriate blood to anticoagulant ratio and inappropriate transport and storage condition[3]. The new update of CLSI guidelines for collection of venous sample give emphasis on greater detail of patient identification, specimen labeling, patient positioning, collecting from mastectomy patients, tourniquet use, adverse reactions, needle relocation, prioritizing veins in the antecubital area and preventing 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 bsilic vein.

Tourniquet application must not exceed one minute before accessing the vein to prevent hem concentration. 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 inch below, not above the insertion site to reduce the risk of an accidental needle stick. 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

CONCLUSION

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, and clinician should be pursued to ensure best patient outcomes, minimize unnecessary costs, 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 hemo concentration 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 hem concentration 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 limit the need to redraw patients, improve laboratory productivity, and decrease testing turnaround time.

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