

## **Strengthen Quality.... Reduce ERR at Preanalytical Phase.....**

**Menka Kapil\***

*Department of Pathology, Santokba Durlabhji Memorial and Research Centre, India*

**\*Corresponding Author:** Menka Kapil, Department of Pathology, Santokba Durlabhji Memorial and Research Centre, India.

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Laboratory quality is known to possess accuracy, reliability and reporting of results in given framework of time. Laboratory medicine is one of the area in health care where quality standards must be high because 70% of clinical decisions are based on laboratory results. Therefore, the impact of laboratory error is very high in terms of economic burden and patient care.

Traditionally the laboratory practice is divided into three phases that is pre analytical, analytical and post analytical phase. Additionally, the term “pre-pre-analytical phase” has been used for the initial part of the pre-analytical phase, focused on test selection and identification of test needed and the term “post-post-analytical phase” has been used for the interpretation of results by the clinician. So, from the laboratory test ordering to interpretation of test results it is a multidisciplinary approach. To attain this approach there must be awareness, knowledge and communication skills present not only restricted to doctors but every healthcare personnel, as the preanalytical stage is such a complex phase in which much of the steps are human dependent and out of the laboratory’s control hence it is the most erroneous part of the total testing procedure.

The preanalytical phase further comprises of sample collection, patient preparation, specimen acquisition, handling, storage and transportation. The errors includes misidentification of patient for example when identifying the patient it is necessary to provide full name, address, identification number so that it cannot be exchanged with the patient of similar name, next is mislabeling of samples that is if a collection container is used for transport, the label should be placed on the container and not on the lid this is to avoid wrong identification of the specimen also the labeling of vials must be prior to collection of samples so not get intermingled with other.

Hemolytic samples which in turn can lead to false high values for potassium, lactate dehydrogenase (LDH), iron and magnesium, these variables are very crucial for life of patients so before interpretation of critical high and low values there must be check on the preanalytical variables of hemolysis that may be vigorous shaking of vial during mixing or inadequate ratio of sample to anticoagulants or forced push of sample from syringe to vacutainer. Lipaemic samples interfere with optical measurements, mainly interfere with electrolyte analysis. Hemoconcentration the another factor will cause spurious elevation of red blood cells, hematocrit and hemoglobin which might give wrong interpretation of test result if not interpret judiciously will lead to wrong intervention.

Erroneous mixing contribute to erroneous results because of improper sample to additive ratio hence it must be kept in mind that serum separator tubes contain clot activator, should be inverted five times to mix the activator to facilitate clotting of blood. Other tubes containing additives, such as heparin, EDTA and fluoride have to be inverted approximately eight times for proper mixing of the anticoagulant with the blood and prevent clotting also it should not be shaken vigorously (to prevent haemolysis). The another variable is exposure to light which affect the results of photosensitive parameters as bilirubin although a small concern but causes the great effect on testing.

Delayed delivery of samples from collection area to processing area of laboratory many a times causes degeneration of cells which in case of body fluids are of utmost importance or sometimes delay in transportation promotes growth of bacteria which elicit false result as in urine sample it will be a false interpretation of bacteriuria, so clinicians must be aware of it and clinically examine the patient with correlation to laboratory findings. Thus the preanalytical errors occur prior to the specimen received in the laboratory, causes the erroneous findings which are not unexpected as there may be many healthcare personnel who are involved in the sample collection process and also the collection of samples are distant to laboratory premises which creates more errors to occur. Therefore, policies for transportation of samples must be very stringent. Many tests affected by posture, stress and diurnal variation so performing each and every tests all such variables must be kept in mind.

Thus, concern to preanalytical errors is not only to influence patient care and contribute to incorrect diagnosis but it may also contribute to increased healthcare costs. Many studies revealed that preanalytical errors may contribute approximately 0.23% to 1.2% of total hospital operating costs which is very high economic burden on Healthcare.

Thereby eliminating or reducing these errors needs a collaborative efforts by healthcare organizations, product manufacturers, policy makers and health care personnel. Clinicians must also be aware of pre analytical variations of the haematological, biochemical, immunological profile in order to be able to appreciate and troubleshoot "spurious" variations and to interpret test results adequately.

This effort should begin with a review of potential causes of these medical errors and their effect on both the institution and the patient as medical errors can occur anywhere in the healthcare system. The need is only to identify, rectify and strengthen the areas of concern rather throwing of ball in each others court.

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