



View Points

Introducing an Endocrine Laboratory

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Dear Editor,

The growing sub-specialty in Medical practice is beneficial for the patient as well as for the healthcare providers. Laboratory Medicine is also an emerging field to address the complexity of health arena. In earlier days, all laboratory investigations were performed in the single laboratory equipped with all sorts of machines and manpower. But the scenario has changed now with laboratories being specific for subject like Biochemistry, Hematology, Microbiology, Immunology, Genetics and many more. These specifications have proven that by doing so, there is better patient care and involvement of health personnel in various research activities, which ultimately helps in identification of cost effective laboratory approach of diseases.

Endocrine laboratory is a branch of laboratory medicine that deals with hormonal measurement and an interdisciplinary approach to various endocrine disorders. Biochemical investigation of hormones is complicated since the pattern of circulating hormone changes due to normal physiological process and due to diseased state as well. This is further complicated by the various molecular forms of single hormone and their nature of secretion from human body. The integrated approach by the team of clinician and laboratory personnel can troubleshoot those errors which can potentially lead to wrong interpretation of true result or patient's intervention based on false result.

Considerable improvements have been made in laboratory analysis of various hormones in the past years. For better understanding of how the endocrine laboratory works, we need to consider three phases of any biochemical investigation. First one is preanalytical, which deals with the patient preparation and sampling. This is the crucial step in endocrine laboratory since the pulsatile and circadian nature of hormone secretion limits its random sampling. Various dynamic tests in endocrinology are based on this

pattern of hormone secretion.^{1,2} Amount of sample and type of sample whether serum; plasma; whole blood or urine depends on analytical instruments. For evaluation of Adrenocorticotrophic hormone (ACTH) the sample needs to be collected in pre-chilled vials and should be refrigerated immediately. Sometimes additional test must be performed in same sample to support the finding. Serum albumin is also quantitated when serum calcium is analyzed, and measurement of hemoglobin may be required while reporting abnormal HbA1c value. So, adequate sample is collected for possible repeat of the test or quantification of another analyte. This is particularly important when inferior petrosal sinus sampling is done for evaluation of Cushing disease, where prolactin and cortisol level may also be needed in addition of ACTH to support the diagnosis and to be sure about the anatomical accuracy.³ Likewise, common drugs and other illness in patients which are often overlooked can interfere the hormone assay in autoanalyzer's.

Many endocrinologists, during their patient care may feel that the laboratory results do not support the clinical diagnosis. And they may also experience different laboratory results from two or more laboratories for the same hormone. This is explained by the second phase of laboratory investigation which is an analytical phase that deals with the measurement of analyte in clinical laboratory. Most of the hormones are measured using immunoassay methods that use antibody for analytical measurement. All laboratories must ensure their quality performance by daily running the control which is traceable. The sample of which analyte concentration is known is a control. If this known concentration is according to the international standard, then it is a traceable reference material. This process of running control as a part of quality performance is known as internal quality assurance. Laboratories can also be monitored by comparing their result with result from other laboratories on same sample with similar assay, which is known as external quality assurance. The difference in result of two

or more laboratories may be due to different analytical measurement techniques. There is also unavailability of certified traceable reference material for all hormones, thus results may vary with laboratories. Endocrinologist needs to be educated to ensure that they use the same laboratory for patient investigation and this laboratory should be certified according to the international standard. Various mis-match between clinical picture and laboratory finding can be resolved in the endocrine laboratory by the interdisciplinary approach between clinician and laboratory personnel.

The last phase in biochemical investigation is post analytical, where the results are interpreted. The reference range of hormones provided by laboratories may not match each other and it solely depends upon assay type. Biological and analytical variability that depends upon patient and analyzer respectively should be considered while interpreting result.

Thus, in this growing complexity of health arena an endocrine laboratory, dealing with complex physiology of various hormones in various age group and sex, is required for better implementation of evidence based medical practice.

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