

## Understanding of the disciplines of Laboratory Medicine

### A. Case Studies

1. A patient is brought to the casualty with high fever and generalized mucosal and skin hemorrhage (DIC). The situation demands coagulation study, TLC, hematocrit, Gram-staining, blood culture, PS examination for MP, Dengue serology etc. Integrated approach is possible only in the Dept. of Laboratory Medicine. Either one has to alert the service consultant from established disciplines like Pathology, Microbiology, Hematology or one uses the Dept. of Laboratory Medicine in one place with one versatile expert.

2. A patient has come with complain of passing red colored urine. Whether it is Hematuria or Hemoglobinuria? To confirm this one requires a clinical pathologist! Whether it is hemoglobin or myoglobin in urine? To confirm, this one requires expertise of a biochemist who can distinguish the two in a spectrophotometer. Whether this is black water fever? To have a say on this one requires a microbiologist to confirm *Falciparum* malaria. An expert 'Three in one' could be found in a poly-disciplinary MD in Laboratory Medicine, and not in a doctor who is an MD in Pathology, Microbiology or Biochemistry.

3. A patient presented in ENT or dental OPD with gingival swelling. Routine blood sent to Lab Medicine shows Monocytic leukemia. Hematology Dept. of AIIMS usually does not entertain such blood examination since it is a requisition of a routine hemogram from a routine OPD. All such routine hemograms from all departments are sent to Dept. of Lab Medicine. Another such example: A patient reports to GE OPD with hepatosplenomegaly. Routine blood smear shows CML. Hematology Dept. will not accept this routine blood smear. After Laboratory Medicine Department diagnoses such surprising case as leukemia cases are referred to Hematology Dept for follow up.

4. CSF has been sent to Emergency Lab. Technician calls SR, "Sir, under microscope there are some round structures which look like lymphocytes but their size is larger than that of lymphocyte". Senior resident rushes in, and finds that these are fungi, called *cryptococcus*. He makes an *India ink preparation* and confirms the diagnosis. By this time, sugar and protein of csf has already been done by clinical biochemistry laboratory. For such cases the hospital requires in one person a clinical pathologist and a microbiologist and a biochemist, which is available only in the discipline of Laboratory Medicine.

5. A patient of Hepatitis reports for lab investigation. He requires (i) Serum enzymes (ii) Prothombin Time and (iii) Viral markers and viral load. Where will the clinician send the patient? Send it to Pathology – they will ask for liver biopsy. Main Microbiology department is not concerned with viral markers of Hepatitis. Hematology Dept. will say it is not a primary hematological disorder and they are not supposed to entertain such cases. The discipline of Lab Medicine is the only Dept. where all these can be done simultaneously and all reports are ready within 8 hours.

## **B. Equipments:**

There are several equipments now available which absolve such divisions and sections in laboratory science. Three examples are cited below:

Chemiluminescence Analyzer: One can do serum chemistry, as well as viral makers and hormones, also Vit. B<sub>12</sub> and Folate for Hematology

Flowcytometer: Used for hematological, microbiological and biochemical (molecular) diagnosis.

PCR, Gene-Sequencer and Micro-array technology: Required as common instrument for all four sub-disciplines.

Automation in Tract has been evolving as an “One-Lab Concept” with centralized blood collection center having pre-phlebotomy (APTL) and post-phlebotomy automation (conveyer belts for distribution of collected samples), pre-analytical automation, Analytical automation with several automated analyzers connected in series and in parallel including knowledge-partnership with manufacturer resulting in One-window solution for patients

## **C. Academic Reform:**

MD in Laboratory Medicine brings with it an academic reform in the discipline of laboratory Sciences and a far-reaching transformation of the subject.

## **D. Management:**

We prescribe in BSc (MLT) course to train a technician in Pathology, Microbiology, Clinical Chemistry, Hematology and in clinical pathology. Don't we require a postgraduate laboratory physician who is all-rounder for all basic laboratory investigations at level I? Laboratory Physician is responsible for managing the service education and research of the discipline and also takes care of Safety, Ethics and Legal aspects of laboratory disciplines

## **E. Resource Economy:**

Do the Govt. of India need to post three or four postgraduate specialists in a District or Subdivisional Hospital or in Community Health Center or would they prefer to appoint one laboratory physician who is all-rounder? Do the Govt. / Authority of Hospital want to put all diagnostic equipments in one central laboratory or duplicate it in several departments?