Why Medical Students Should Study Laboratory Medicine

By Fred H. Rodriguez Jr., MD, FASCP
For a patient whose complete blood count is normal and who has no history, signs, or symptoms of chronic blood loss or liver disease, the physician orders serum iron, serum ferritin, total iron binding capacity, and several other iron-related laboratory tests. For another patient with no history, signs, or symptoms of joint pain, rash, or systemic complaints, the physician orders antinuclear antibody, serum complement, and other autoimmune disease-related laboratory tests. Unfortunately, it is common practice for physicians to order laboratory tests with little or no clinical evidence or justification.

The risk for inappropriate utilization is even greater for the newer, more expensive molecular laboratory tests. Inappropriate clinical laboratory test utilization not only may increase the cost of health care but also does not contribute to enhancing the quality of care or the clinical management of the patient.

To achieve better patient outcomes and to curb costs, it is critical for undergraduate medical education to introduce students to the appropriate utilization of clinical laboratory tests. Pathologists and laboratory professionals can provide the necessary leadership to reduce healthcare costs by preventing overutilization or misutilization of tests.

Currently, the majority of U.S. medical schools do not have a formal introductory course on the principles and practice of laboratory medicine. Moreover, this training in the use and interpretation of clinical laboratory test results is absent in the curriculum of most health professions, including nursing and many allied health occupations.

For more than 40 years, faculty in the Department of Pathology of the Louisiana State University (LSU) School of Medicine in New Orleans has presented an introductory course in laboratory medicine that provides 90 hours of instruction during the second year of medical school.

Understanding Different Laboratory Tests

Given the significant number and diversity of clinical laboratory tests available to healthcare providers, any introductory course on clinical laboratory medicine is challenged in the selection and organization of appropriate content. For the student to gain an understanding of the variety of the most commonly utilized clinical laboratory tests, the course at LSU is divided into modules that reflect the traditional organization of the clinical laboratory: clinical hematology, clinical chemistry, clinical microscopy (including urinalysis), immunohematology (blood banking), and related laboratory medicine topics (e.g., point-of-care testing, laboratory accreditation and regulation, laboratory statistics).

The course at LSU emphasizes the appropriate selection of laboratory tests and the proper interpretation of clinical laboratory test results. The hematology and urinalysis components focus on the identification of morphologic features of various disease conditions and their clinical significance. The course format combines lectures, online tutorials, case review sessions, and self-assessment exercises, which include training medical students to perform an evaluation of a peripheral blood smear and microscopic urinalysis.
LSU clinical pathology faculty develops all the content for the course, integrating many clinical examples and case studies. Often, the pathophysiology of abnormal clinical laboratory test results is discussed in relationship to clinical disease, providing medical students with examples of the clinical utility and relevance to the clinical management of patients. Also, this approach integrates basic science physiology, biochemistry, and general pathology to broaden the students’ general understanding of normal health and the alterations caused by disease, enhancing their ability to properly interpret clinical laboratory test results and clarifying the relevance of appropriate clinical laboratory tests to clinical situations.

Most of all, the course helps students identify specific clinical situations in which certain clinical laboratory tests are not appropriate for proper diagnosis and/or patient care. Furthermore, integrating basic science subject material also helps prepare the students for Step 1 of the U. S. Medical Licensing Exam (USMLE). Successful passage of Step 1 of the USMLE is a requirement for advancement to the clinical rotations.

Learning Clinical Justification for Tests

While currently there are no formal objective data on the clinical laboratory test-ordering behavior of LSU students after graduation, informal surveys of students and clinical attending faculty show that these students better understand the important link between clinical justification and the ordering of clinical laboratory tests and the proper use of medical resources.

“The LSU course was a great introduction into understanding why we order tests and when it is appropriate for the patient,” said Alison Heffernan, MD, LSU School of Medicine Class of 2003 and currently a pediatrician at Montgomery Pediatrics, Cincinnati. “I definitely remember the class, and it is still very applicable to my practice today. I frequently order laboratory tests, such as a CBC or urinalysis, which were covered in the introductory course.”

Having just finished his third year of medical school at LSU–New Orleans, Kyle McMullen provides a slightly different perspective. “The clinical pathology course bridges the gap between the acquisition of basic science knowledge and the clinical application of that knowledge,” he said. “I learned the diagnostic algorithms for workup of problems and how to order the appropriate set of tests in a stepwise fashion to avoid unnecessary testing. Finally, I learned how to interpret the tests to narrow down the differential diagnosis. Additionally, the course taught me how the tests were derived, so I had a better concept of why to order specific tests for individual patients.”

“Taking this class before my third-year clinical rotation prepared me to understand the clinical aspects of patient care in the hospital wards. It would have been much harder to have had to learn all this information during my third year.”

Medical literature substantiates that training in laboratory medicine is appropriate and warranted.1 2 The student and faculty surveys indicate that the program at the LSU School of Medicine imparts valuable training in laboratory medicine to undergraduate medical students. To leave training in laboratory medicine to observation and mimicry in the clinical years invites the possibility of the propagation of inappropriate and unjustified clinical laboratory testing behaviors.

Correcting poor clinical laboratory test-ordering practices is much more difficult once a physician is in practice than inculcating appropriate behaviors during undergraduate medical education. Education in the appropriate and justified utilization of clinical laboratory tests has the potential to improve healthcare quality and lower healthcare costs.

References


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