

Editorial Comment

The Cardiovascular Teaching Laboratory: Linking Medical Education, Clinical Practice, and Research

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Medicine is both an art and a science whose relative proportions have seen dramatic changes over the years. Until the middle ages medicine was based on Greek theory and philosophy rather than on scientific observation. The teachings of Hippocrates and Galen guided medical practice, and it was widely believed that the human body had four humors: blood from the heart, phlegm from the brain, yellow bile from the liver, and black bile from the spleen.¹ Good health was attributed to the equilibrium and illness to the disequilibrium of bodily humors. The scientific method began in the fifteenth century with the recognition of the importance of human dissection, leading to a change in the emphasis of medicine from philosophy to practical physical science and anatomy. The scientific method consisted of a set of techniques used by the medical community to investigate disease, providing an objective framework within which to make scientific inquiry and analyze the data in order to reach a conclusion about that inquiry. The steps in this process included identification of a problem, postulation of a hypothesis, testing of the hypothesis by (most importantly) observing and experimenting, and then interpreting the data and drawing a conclusion.² With the invention of Laennec's stethoscope, Leeuwenhoek's microscopic methods, and Roent-

gen's X-rays, science was becoming more and more important in medicine. Harvey's scientific study of human circulation, Koch's scientific studies of microbes that caused human diseases, and the Curies' studies of radium were all important medical advances based on science. Of course there are many more than the few mentioned here.

The field of cardiovascular medicine has developed at an unprecedented rate during the last few decades. New understanding of diseases, new treatment modalities, and technological advances have led to a knowledge explosion, as well as a better understanding of diseases and their management. New health challenges have arisen due to an increasing population, the emergence of new diseases, as well as to an increased lifespan and globalization. Current medical practice is "evidence based", with special emphasis on the data obtained from large clinical trials, often cleverly designed, and supported by the pharmaceutical industry. In the context of such extraordinary developments, cardiology has splintered into many highly specialized disciplines and has become increasingly laboratory-focused, and less rooted in bedside evaluation.³ Current cardiovascular programs are producing fewer broad clinical cardiologists than ever before. Most trainees want to become expert in cardiac proce-

dures, so opt for additional months and years of such apprenticeship and relatively less time learning the most precious aspect of medicine – how to gain an ‘insight’ into the whole patient. It is doubtful, however, whether these specialists will have the appropriate training to evaluate the patient’s overall physical and emotional state, before prescribing a drug or an intervention. It is, therefore, imperative that the students of medicine conceptualize and internalize the following three dimensions of the medical profession:⁴

- being knowledgeable (having and continually seeking a sound grasp of the facts and scientific evidence);
- being empathic (continually seeking to understand the ‘other’);
- being reflective (continually seeking to make sense of experience by critically thinking through personal and interpersonal actions and reactions).

Unfortunately, much of what we do has not been scientifically studied, and even that which has requires clinical judgment as to the various options. Good practice requires, in addition to the explicit research evidence, the accumulated experience and wisdom of the treating physician. Sir William Osler was one of the greatest medical teachers of all time, whose teachings are as relevant now as they were 100 years ago. His textbook, *Principles and Practice of Medicine*, a volume that is jam-packed with evidence, includes the following two quotations at the start: “Experience is fallacious and judgment difficult,” (Hippocrates) and “Medicine ... is an art which considers the constitution of the patient, and has principles of action and reasons in each case” (Plato).⁵

In this issue of the Hellenic Journal of Cardiology, Wooley et al present the Cardiovascular Teaching Laboratory (CVTL) at the Department of Cardiology of the Ohio State University, as: “an ambulatory teaching model, the outgrowth of a concept that places ambulatory learning and teaching in a dignified, contemporary setting and emphasizes the central role of the patient interacting with the student of medicine and the attending physician.”⁶ We had the good fortune to train as a visiting scholars in the CVTL under Drs. Boudoulas and Wooley, two outstanding medical educators and clinicians in the mold of Osler. Both have been on the front line of the ‘art versus science’ evolution and believed that students

of medicine were becoming much too dependent on the various machines and technologies available. They have continuously emphasized the mosaic approach, which correlates patient history, family history, symptoms, physical findings, and test results, to reach a diagnosis and have organized an environment of learning in a “patient oriented, technologically integrated setting.” This environment has bridged theory and practice and extended knowledge, providing multiple opportunities for exposing students of medicine to clinical and genetic research, culminating in the publication of seminal papers on the Marfan syndrome, the floppy mitral valve, aortic function, atrial function and left bundle branch block.

The CVTL was organized in the United States, a resource-rich and administratively efficient part of the world. A major challenge in medical education delivery is in resource-poorer areas, like Greece, in which medical schools are chronically under-funded, suffer from administrative limitations, and are obliged by the state to train a larger number of students than they can accommodate. Problem-based learning and integrated teaching have been difficult or almost impossible in this setting, requiring dramatic changes as regards financial resources and administration. However, since proper medical education is essential, not only for the benefit of the students of medicine and doctors, but above all for the patients, we are obliged to offer the best possible education in this country under the currently unfavorable circumstances. In this regard, the CVTL can be extremely useful, serving as a raw model of excellence in medical education.

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