Cardiovascular Nuclear Medicine—Training for the Future

The study by McPhee and Garnick, entitled "Imaging the Heart: Cardiac Scintigraphy and Echocardiography in U.S. Hospitals (1983)" (*1*), in this issue of the Journal is a cause for both great satisfaction and gnawing concern. We can derive considerable satisfaction from the authors' observation that radionuclide imaging of the heart has not only gained acceptance among investigators and clinicians at tertiary care hospitals, but has also permeated to smaller primary care institutions. The gnawing concern stems from the number of procedures performed per institution—~20% of the hospitals perform 80% of the procedures, and from the observation that >40% of institutions capable of performing cardiac scintigraphy performed no radionuclide procedures in the month prior to responding to the questionnaire. The data for the radionuclide procedures stands in stark contrast to that for echocardiography—in the latter case more procedures are performed, and only 4% of institutions performed no procedures in the month prior to evaluation.

The value of the information provided by cardiac scintigraphy depends on both the quality and clinical relevance of the interpretation. Ongoing experience, derived from evaluating a large number of studies on a regular basis, is required for the nuclear physician to maintain clinical acumen. When cardiac scintigraphy is performed infrequently, it becomes difficult to maintain interpretive skills and as a result scan interpretations become descriptive—rather than providing information about the pathophysiology of disease. Skilled nuclear medicine consultation should include not only an assessment of the findings of the radionuclide procedure, but also a discussion about the implication of the findings in the patient's management. Complex technological approaches to the interpretation of the radionuclide procedure cannot substitute for training and experience. Quantification is a valuable adjunct, but should be used in conjunction with well-honed clinical judgement and a firm grounding in cardiac physiology to arrive at an interpretation of the procedure that is relevant to patient care.

At present, there is room for some disagreement about the optimum modallty for evaluation of ventricular function. Among all observers, however, there is an increasing awareness of the important clinical role that cardiac scintigraphy can offer in the evaluation of myocardial ischemia. This has led to an increasing interest on the part of cardiologists to gain the required training to be eligible for licensure by the Nuclear Regulatory Commission. While the amount of training required for cardiologists to safely handle radionuclides has not yet been determined by the NRC, it is likely to be similar to that required of radiology residents. Since cardiologists understand the clinical implications of the radionuclide procedures, their training will probably emphasize the technical and safety issues related to the performance of cardiovascular nuclear medicine (*2*). The appropriate emphasis on training of radiology and nuclear medicine physicians should be slightly different. Diagnostic imagers are typically proficient in technical aspects, but may lack an in-depth understanding of the pathophysiology of heart disease necessary to formulate a clinically meaningful consultation. We need to emphasize those skills to our trainees, and we need also to continuously emphasize to ourselves the clinical importance of the interpretation we generate.

Cardiovascular Nuclear Medicine is evolving at a rapid rate as evidenced by the recent descriptions of: Preliminary findings with a new technetium-99m myocardial perfusion agent in human subjects (*3*); development of an instrument to permit the continuous recording of ventricular function in ambulatory subjects, to evaluate the incidence and severity of silent ischemia (*4*); and antibodies for imaging the location of acute myocardial necrosis (*5*) and thrombus (*6*). These new techniques will increase the value of radionuclide procedures in the care of cardiac patients.

To foster the continued growth and acceptance of cardiac scintigraphy, we have to train

well, and strive to maintain clinical proficiency. If we meet these challenges, cardiovascular nuclear medicine will continue to grow.

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REFERENCES

1. McPhee SJ, Garnick DW: Imaging the heart: Cardiac scintigraphy and echocardiography in U.S. hospitals. *J Nucl Med:* in press, 1983
2. Pohost GM, Adolph RJ, Beller GA et al: Task force V: Training in Nuclear cardiology and nuclear magnetic resonance. *J Am Coll Cardiol* 7:1209–1212, 1986
3. McKusick KA, Holman BL, Jones AG, et al: Comparison of three Tc-99m isonitriles for detection of ischemic heart disease in humans. *J Nucl Med* 27:878, 1986
4. Tamaki N, Yasuda T, Moore RH, et al: Cardiac response to various activities in normal subjects by an ambulatory ventricular function monitor (VEST). *J Nucl Med* 27:911, 1986
5. Khaw BA, Gold HK, Yasuda T, et al: Scintigraphic quantification of myocardial necrosis in patients after intravenous injection of myosin-specific antibody. Circulation: in press, 1986
6. Kanke M, Yasuda T, Matsueda G, et al: Detection of residual coronary thrombi after reperfusion of experimental myocardial infarction using In-111 labeled monoclonal antifibrin antibody. *J Nucl Med* 27:910, 1986