EDITORIAL

Technologists Are Not Fungible

Although our nation's founders wrote in the Declaration that "All men are created equal," we have always doubted the validity of the "politically correct" view that this was ever meant to apply to skills or aptitudes, and we are certain that it does not encompass interest or ambition. Why people choose to become technologists and how they will select their specialty are best explained by the results of their individual responses to the inherent inequality of such characteristics. It is part of the process by which the "round" individual seeks the round hole and the "square" individual, seeks the square hole.

Nuclear medicine, unlike radiology, began as tracer chemistry, not as an imaging speciality. One of the earliest tracer experiments followed a plant's absorption of radioactive lead from the soil. Early human investigations utilized radioactive tracers to study the metabolism of iodine in the thyroid and of iron in bone marrow. Clinical application was of interest primarily to endocrinologists and hematologists, as were many of the early therapeutic applications, such as thyroid ablation with ^{131}I and bone marrow suppression with ^{32}P. It was only later, after the Anger camera had replaced point-by-point scanners, that imaging and tumor localization came to dominate the practice of nuclear medicine. This change is, of course, mirrored in the work of the nuclear medicine technologist. Where previously the technology had required skills similar to those of the clinical chemist, the shift to imaging brought the technology much closer to that of the radiologic technologist.

For a period, perhaps now ending, the distinctly chemical branch of nuclear medicine called radioimmunoassay (now renamed ligand assay) continues, at least in some laboratories, to provided a tie to analytic chemistry and a refuge for technologists more comfortable in chemistry than imaging. In most other venues, RIA has been attached to the clinical chemistry laboratory. With this cord cut, nuclear medicine can be characterized as the discipline in which radionuclides are used for imaging and for therapy.

In response to this trend, the training of the nuclear medicine technologist is predominantly in the theory and practice of imaging; there is less and less exposure to the techniques of chemical analysis. For accreditation by the Joint Committee for Educational Programs in Nuclear Medicine Technology, a program currently is no longer required to offer any specific hours of radiochemistry, in contrast to the 160 hr a few years ago. Prospective trainees know this and choose between nuclear medicine and clinical chemistry accordingly.

As pointed out elsewhere (*1*) in this issue of JNM, an important consequence of the trend away from volumetry, pipetting and the other quantitative aspects of analytic chemistry, is that nuclear medicine services may perform poorly when asked to use Schilling's method to measure vitamin B12 absorption. Similar lack of facility is likely when a nuclear medicine department attempts other quantitative, nonimaging studies such as the measurements of red cell and plasma volume, red cell survival, and iron turnover. Yet, as long as there are no better, nonradionuclide methods and the use of the radionuclides requires governmental approval, these nonimaging procedures will remain among the duties of the nuclear medicine imaging department.

The prospects for these tests are far from ideal. I had thought of red cell mass determinations as being similar to the Sleeping Beauty myth, but they are really more like Cinderella: potentially beautiful but treated with disdain. Radiologists are likely to refer to these tests as "wet work." Nuclear medicine physicians with backgrounds in hematology or endocrinology value these measurements, but they find it difficult to retain technologists with the needed training and practice.

A quick reference to any text of medical technology will show that several pages are likely to be devoted to the nuances of the apparently simple technique of preparing and pipetting a blood specimen for analysis. Just to cite a few typical subject headings and subheadings (*2,3*):

- Laboratory equipment and specimen handling:
  - Glassware, scrupulously clean, unscratched, siliconized for platelet preservation when applicable
- Standards, preparation and calibration:
- Blood sampling, anticoagulation, component separation, hemolysis
- Specimen handling, transportation, preservation:
  - Sample preparation, centrifugation, aliquoting
- Preparation of the patient:
  - Exercise, physical activity, emotional stress
  - Posture
  - Duration of tourniquet application
  - Nutrition, fasting, diet, ethanol
  - Medication, drugs, tobacco smoking.

Which returns us to our earlier comment: today's nuclear medicine technologists are usually not current in the methods of chemical analysis. Whether we regard this as a matter of interest or training, and whether we accept the liberal view that any good technologist can learn to follow any

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well written procedure, we have to concede that the nuclear medicine technologist seldom has the opportunity for regular practice. The skills required for quantitative chemistry can be learned, but they cannot be maintained without practice.

This evaluation of a kit in this issue of *JNM* for doing both parts of the Schilling test simultaneously, although directed primarily at the relative convenience of the method, shows how hard it can be for nuclear medicine technologists to obtain reliable results with volumetric procedures. We suggest that it is important for practicing nuclear medicine physicians, technologists and training program directors to recognize the special demands of volumetric analysis. Deciding whether these and related techniques of volumetric and gravimetric analysis can be fitted into the training schedule, and how these tools can be maintained by the practicing technologist, is the challenge.

This problem could perhaps be solved by fiat, assigning the procedures to appropriate technologists appropriately supervised, changing the selection and hiring of technologists, transferring the work to another department, referring to a department in an institution with higher volume, or by employing other administrative and technical gambits. All of these are complicated by economics, politics, questions of turf and vested interests; nevertheless, unless we find a solution, Cinderella will continue to remain with her ashes. Our message is simple: we will have to feed the orphans or give them up for adoption.

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REFERENCES

1. Krynycki BR, Zuckier LS. Accuracy in using a dual-isotope Schilling Test to measure urine samples: a multicenter study. *J Nucl Med* 1995;36: 1659–1665.
2. Henry JB. *Clinical diagnosis and management by laboratory methods*. WB Saunders; Philadelphia: 1991: 68–75.
3. Bauer JD. *Clinical laboratory methods*. CV Mosby; St Louis: 1982:3–32.