The Highlights Lectures, 1981–2009

H.N. Wagner, Jr.

Reston, VA: Society of Nuclear Medicine and Molecular Imaging, 2015, 344 pages, $99.00

For many years, the late Dr. Henry Wagner would review the posters, abstracts, and other research presented at each annual meeting of the Society of Nuclear Medicine and Molecular Imaging and conclude the meeting with a lecture on its highlights. This book, *The Highlights Lectures, 1981–2009,* is a compilation of Highlights Lectures reprinted from the "Newsline" section of *The Journal of Nuclear Medicine.*

Instead of being arranged into traditional chapters according to content or theme, the individual Highlights Lectures are listed separately in chronological order, with the table of contents indicating the page number for each lecture.

Dr. Wagner had a wonderful way of presenting information that is clear, convincing, and a joy to read. Written or presented information is good only if people are willing to read or listen to it. Dr. Wagner took great care not only to point people in the direction of useful procedures for a specific patient outcome but also to address any procedures that were not living up to expectations and needed to be replaced by others. This honest perspective by Dr. Wagner assures readers that he would not recommend a procedure, nuclear medicine–related or otherwise, if he did not believe it to be in the best interest of the patient.

Starting with the first lecture, in 1981, Dr. Wagner made an impact by bringing several thoughts to mind, such as the ideas that research is not lost even if it may not be useful for the specific purpose intended, that a long time may be involved for a concept to become a useful procedure, and that a large number of people and a great amount of teamwork are needed to develop concepts into useful procedures.

One example of an early concept that became useful in a variety of ways is the work of Heinrich Schelbert and colleagues at UCLA on glucose metabolism and coronary artery disease. The idea that this research might be useful for PET imaging was mentioned in the Highlights Lecture of 1981. As we read through the subsequent lectures, we see how this information on glucose utilization becomes incorporated into other areas. For example, the 1993 Highlights Lecture, "Oncology: A New Engine for SPECT/PET," shows glucose utilization being discussed in terms of brain imaging for neuronal activity and in terms of oncologic applications. As the lectures continue through the years, the increasing uses of ^{18}F-FDG, the relationship between glucose utilization and differentiation of benign from malignant tumors, and the efficacy of treatment for a wide variety of cancers are important themes.

The 1981 lecture also referred to the work of Ronald Jaszczak on improving camera systems and on performing studies using phantoms. The importance of technologic advances, along with advances in radiopharmaceuticals and education, was also stressed. In the 1986 Highlights Lecture, Dr. Wagner stated:

> It behooves nuclear physicians who plan to be seriously involved in nuclear cardiology to spend the time and effort required to keep up with the important technical advances being made—including the new tracers such as isonitriles, SPECT, automated data processing, and a systematic approach to data handling.

On many occasions, Dr. Wagner commented on important technologic advances, such as advances in radiopharmaceuticals, computer technology, PACS, and the Internet. He also noted how necessary these components are to advancing the fields of nuclear medicine technology and molecular imaging and, most importantly, to improving diagnostic and prognostic methods for patients, and he made predictions about the future of some of the procedures presented.

Throughout the lectures, Dr. Wagner focused on the issues of reimbursement, cost effectiveness of imaging procedures, and what is in the best interest of the patient. The theme of cost containment and reimbursement was introduced in the 1983 Highlights Lecture, in which he stated that "Increased attention to cost-containment is revealing that real savings result from better treatment, rather than from decreasing diagnostic studies." Some cost containment methods that he mentioned were the use of myocardial perfusion scans for early diagnosis to reduce the number of heart attacks, prognostic uses such as to reveal evidence of distal metastases and thus whether surgery would actually benefit the patient or be unsuccessful, and use of sentinel node imaging and intraoperative probes to help pinpoint the sentinel node and reduce the need for complete lymph node dissection. In the 1997 Highlights Lecture, Dr. Wagner noted that in a study by Valk et al., from Sacramento, California, a savings of $1,800 per patient was calculated. "The finding of distant metastatic disease by whole-body FDG-PET imaging resulted in the cancellation of six lung resections, four lymph node dissections, two liver resections, one laparotomy and one pelvic exenteration." As Dr. Wagner noted the many examples of cost reduction that would be achieved if diagnostic testing were to prevent surgery, he also noted the fact that these costs were for only the actual surgery, not for possible adverse events from the surgery, and that if these were factored in as well, the cost savings could be much higher.

When a certain diagnostic test was being touted as the best, Dr. Wagner frequently pointed out that the test might be best for certain situations but not others, or that multiple tests should be used, or that there now was a test that would provide better patient results. Dr. Wagner always stressed trying to achieve 100% accuracy with diagnostic tests. He at times advocated for blood tests, CT scans, MRI scans, or SPECT scans. His theme was always that we should not be looking at these as competing modalities but that all modalities were useful and often should be combined. Dr. Wagner supported the use of hybrid imaging, chemistry, genetics, and molecular imaging and had a way of explaining how everything works together.

The later lectures reflect the growth of technology, describing advances in molecular imaging such as somatostatin receptor imaging, new agents to study Parkinson disease, cadmium telluride detectors, and solid-state detectors. It is only fitting that Dr. Wagner should title his final lecture "Creating a New, Smarter Health Care," as this was his focus throughout the entire lecture series.

These lectures were not intended and should not be used as a protocol or procedure for current practice. The last lecture was presented back in 2009, and in reading this book I find it clear that Dr. Wagner would intend for anyone involved in the field of nuclear medicine or molecular imaging to be constantly and consistently updating their knowledge to reflect the best current practices.

This book will be of interest to physicians, technologists, researchers, authors, residents, and students who wish to learn more about the history of nuclear medicine; the background behind some of the studies currently being performed; and possible future directions for the profession.

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Published online Mar. 10, 2016.
DOI: 10.2967/jnmt.116.175042

Myocardial Perfusion Imaging 2016: Quality, Safety, and Dose Optimization

Mary Beth Farrell, Ed.

Reston, VA: Society of Nuclear Medicine and Molecular Imaging, 2016, 178 pages

Myocardial Perfusion Imaging 2016: Quality, Safety, and Dose Optimization—an e-book available to SNMMI members free of charge—is an accessible reference for the practicing technologist who wants to quickly look up standard imaging protocols, check appropriate dose and administration for pharmacologic stress agents, or review general principles and common practices. Rather than being written in a scholarly tone (e.g., citing each original research paper or delving into controversies about cutting-edge practices), this book is an easy conversation between technologists about commonly agreed-on practices in nuclear cardiology in 2016.

The stated goal of this publication is to "improve quality, increase safety [of patient care], and reduce radiation burden in MPI," and the authors set about achieving that goal by reviewing the most basic concepts in perfusion imaging and stress testing. These concepts, when applied properly in the nuclear cardiology lab, result in optimal patient care. In Chapter 1, authors Williams and Reames put into words what every technologist knows but might not be able to succinctly express: why do we do this test, anyway? In a short paragraph entitled "Rationale," the authors lay the physiologic and scientific foundation for the rest of the book—7 sentences that describe what we do and why we do it. This chapter, like all the chapters, ends with a list of references that points the reader to additional resources if desired.

Chapter 2, "Patient Preparation and Education," is a solid mix of commonsense advice (helping patients feel more comfortable with nuclear medicine procedures by taking the time to explain them) and critical protocol instructions (nothing-by-mouth instructions, interference from caffeine) that could seriously undermine the results of a study if not followed properly. Bolus and Zimmerman provide two useful tables that reference β-blockers (including generic and brand names) and caffeine-containing medications and substances.

"Stress Testing" (chapter 3), by Mann and Williams, starts with a conversation about why treadmill stress testing is an independent prognostic variable and how it is used in a standardized fashion from site to site (e.g., the Bruce protocol). Pharmacologic stress agents are thoroughly discussed, including dosing, protocol timing, and safety information. The strength of the book is demonstrated by this chapter, in that the authors took a huge volume of scientific research, medical guidelines, and drug development information and distilled it down to the most practical and necessary information for a practicing technologist.

Radiopharmaceuticals for cardiac imaging are discussed in Holbrook's chapter 4, "Radiopharmaceuticals." The author summarizes key information about SPECT and PET tracers, providing the fundamentals to technologists who are performing one or the other modality but wish to keep abreast of what is happening across the entire spectrum of nuclear cardiology.

"Quality Control" (Chapter 5 by Farrell and Foster) offers some great visual examples of what can go wrong when you are not paying attention to quality control results. This is an underserved topic in nuclear medicine, often considered unglamorous by working technologists who performs these procedures early in the morning before their "real work" begins. I applaud the editor for dedicating 25 pages of expensive real estate to this potentially boring but ultimately critical topic (including 20 large photographs, some in color).

Chapters 6–8 are the real heart of the matter (pun intended!). In chapter 6, Mantel and Crowley spell out, and diagram, all the commonly used protocols for SPECT and PET myocardial perfusion imaging. These are followed by accepted protocols for assessing viability with both modalities. Acquisition of PET and SPECT images is discussed by Basso in chapter 7, including variables such as collimation, 2 versus 3 dimensions, crystals, and gating. Image processing is covered by Folks, Cooke, and Galt in chapter 8, beginning with reconstruction, continuing with filters, and closing with quantitation. These 3 chapters could be a mini-book in themselves, as they contain all the information required for a technologist to operate a SPECT or PET scanner (albeit not inclusive of vendor-specific software algorithms).

No nuclear medicine publication would be complete without a section on image artifacts, and Pagnanelli in chapter 9 gives us the most common artifacts in SPECT myocardial perfusion imaging along with an explanation of how to avoid them. Although some of the SPECT artifacts are eliminated by the use of PET, particularly attenuation issues, PET/CT can introduce unique artifacts. Additional discussion and case examples of potential PET/CT artifacts would be useful for the next edition.

Chapter 10, on basic interpretation, by Chen and Hajj nicely supplements the technical conversation with an overview of risk stratification, the systematic approach to interpretation and reporting, and a quick discussion of quantitative results. The chapter generously includes 11 case studies, including examples of SPECT and PET,