

Hospital Radiopharmacy Principle and Practice

Malcolm Frier, John G. Hardy, Stewart R. Hesselwood, Rosemary Lawrence, The Institute of Physical Sciences in Medicine, York, England, 1988, 47 pp, \$26.00

This book is an update of the Hospital Physicists' Association's report *The Hospital Preparation of Radiopharmaceuticals*, the need for which became apparent following recent legislation and official recommendations, and after most of the commonly-used radiopharmaceuticals became available commercially as licensed products.

The present report is intended to provide guidance to hospital staff involved with the preparation, dispensing, and quality control of radiopharmaceuticals. A chapter is devoted to describing the facilities needed for the preparation of radiopharmaceuticals such as contained work stations, clean and aseptic areas, enclosed work stations, and storage areas. It also describes the use of labels and signs.

Another chapter describes the equipment involved such as shielding, handling devices, assay calibrators, contamination monitors, and waste storage.

Quality control is the subject of a larger section. This chapter describes the detection and measurement of radiation, including various types of detectors. It also describes the determination of radionuclide identity and purity, the determination of chemical and radiochemical purity with mention of the chromatographic techniques involved, as well as gel filtration and electrophoresis. It discusses other physicochemical and biochemical parameters of the radiopharmaceutical preparations such as measurement of particle size in cases of colloidal preparations, macroaggregates, microspheres and aerosols, in addition to pH, sterility, and apyrogenicity.

Process control is the subject of another section, which includes dose calibrator performance assessment, monitoring operators, and monitoring air flow and contamination. Monitoring of radiation doses to staff and contamination to personnel, equipment, and environment is described in a separate section.

The book may prove useful to personnel engaged in designing a hospital radiopharmacy. The facilities required and the procedures to be followed have been outlined along with references to current regulations where appropriate.

This revised report has drawn heavily from the previous version and the British Nuclear Medicine Society's publication *Quality Assurance of Radiopharmaceuticals—A Guide to Hospital Practice* and encompasses the expertise of medical physicists and radiopharmacists. The subject of this report is still evolving, but the basic principles described should remain valid for the foreseeable future. The book refers only to British legislation and official recommendations. It may not be quite inconvenient, however, to find the corresponding local regulations for the sake of comparison. The book can be considered as a handy reference for those involved with hospital radiopharmacy with additional reading material listed in 16 references, a concise glossary, and a listing of some official regulations and guidance.

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Neuroimaging II

F. Aichner, F. Gerstenbrand, N. Grčević, eds., Stuttgart, Gustav Fischer, 1989, 322 pp, \$96.00

This volume is the published version of the papers presented at the 2nd International Symposium on Neuroimaging, 1987. The collection is divided into two major sections, "Functional Neuroimaging" (21 papers), and "Morphological Neuroimaging" (23 papers). All but four reports are from European investigators, and they vary greatly in length and quality. Some are no more than brief accounts of clinical experience, while others present research findings. Unfortunately, there are many typographical errors and other editorial lapses throughout the text. The inclusion of introductions and/or summaries of the papers contained within a section would increase the value of the work.

Section 1, Functional Neuroimaging,

contains papers dealing with PET (4), SPECT (10), xenon (2), EEG (2), and one each on NMR spectroscopy and ERD (event-related desynchronization). The PET papers begin with a brief review of brain receptors in neurologic disease. Other subjects covered include studies of dopaminergic functions, glucose metabolism and blood flow in cerebrovascular disease, and a brief article examining dopamine binding and amino acid metabolism in pituitary adenomas. Much of the material in these brief reports is a mix of old and new information. Unfortunately, these articles do not make many new or major contributions to advancing our knowledge of the role of PET in neurologic and psychiatric disease. On the other hand, several reports offer new and provocative applications for SPECT utilizing IMP or HMPAO. These demonstrate the effects of a variety of stimuli on rCBF as seen with SPECT imaging. The papers reporting findings with xenon present little in the way of new information. The remaining articles in this section deal with EEG and NMR spectroscopy that touch on subjects tangential to the core interests of the nuclear medicine neuroimaging community.

The papers on morphologic neuroimaging cover a broad range of topics with little apparent cohesion. They range from topics dealing with technologic developments in MR three-dimensional imaging, with almost no neurologic applications to the role of digital subtraction angiography in neuroimaging. Several papers discuss MRI in evaluating neoplasm in the central nervous system. Most are short and are a combination of reviews of current status with images from the author's laboratory. Of the CT-oriented papers, that by Kaousek et al. should be of particular interest to those concerned with correlating SPECT/PET findings with CT in patients with evolving cerebral infarcts. There are also several interesting papers which discuss ultrasound technology. These focus on application of the technique to the evaluation of arterial disease, and how the findings can be applied to clinical management. While not directly applicable to the central focus of most nuclear neuroimaging practitioners, these papers

do bring to our attention the role of other modalities in evaluating patients with neurologic findings.

There is no doubt that this work has some valuable information for those interested in neuroimaging. However, the overall impact of the papers in terms of providing new information is limited. While cost should not be a significant factor in evaluating a work, the expense of this book far exceeds the value of its content. In its favor is the presentation of work with other modalities such as ultrasound that can ultimately add to the general development of the field of neuroimaging.

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Impact of Functional Neuroimaging in Neurology and Psychiatry. Current Problems in Neurology: 5

J. Wade, S. Knežević, V.A. Maximillian, Z. Mubrin, I. Prohovnik, eds., London, John Libbey & Co. Ltd., 1987, 199 pp, \$46.00

This is the publication of the papers presented at the 2nd International rCBF Workshop, 1986. The work can be considered to be made up of two sections, the first examines the basic principles of functional neuroimaging, and the second its clinical applications.

The first paper is an essay devoted to a philosophical discussion of disease, and whether it should be viewed from an anatomic or functional perspective. It, more than any of the other papers, compels us to examine carefully what we are trying to achieve with functional neuroimaging in clinical neurology and psychiatry. The six short papers that make up the remainder of the first section describe the basic principles underlying functional brain imaging. Topics covered include the early work with xenon and move to more recent developments in both SPECT and PET. The level of sophistication varies greatly from paper to paper. While it is not possible to discuss every paper in this review, some papers do warrant comment. Ell et al. present a relatively unbiased and excellent review of the radiotracers available for brain imaging (paper 6). The paper gives the reader new to brain imaging a good basis for making decisions regarding choice of tracer. A somewhat more biased ap-

proach to tracer selection is given by Lassen et al. in their paper on cerebral blood flow tomography using gamma-emitting radioisotopes. They note that image resolution of HMPAO is superior to that of xenon-133, but consider "iodinated compounds to be obsolete as CBF tracers using SPECT" (p. 51). However, they suggest that if appropriate ligands are developed, then tracers such as IMP may be useful for receptor imaging. Many investigators would take issue with their assertion that IMP is obsolete as a viable brain imaging agent. Papers 2-5 present brief descriptions of various imaging procedures and short statements as to their clinical application. The section ends with a paper discussing PET's application in neurologic disorders and serves as a transition to the second section where the emphasis is on clinical issues.

The nine papers in the clinical section address specific neurologic or psychiatric problems. Topics range from the more common disease states such as stroke and Alzheimer's disease to esoteric applications. The latter includes, for example, consideration of migraine and the mapping of cerebral blood flow during cardiopulmonary by-pass surgery.

The general format is similar across all the presentations: an introduction and brief discussion of the utility of the various imaging techniques, i.e., SPECT, PET, MR, etc. in elucidating the clinical syndromes discussed. Some papers present data based on the authors' own work, but most are reviews of what was then the current status of work for a given clinical problem. The quality of these presentations varies greatly, ranging from outstanding to being at best average. This section offers the relative newcomer to functional brain imaging an uneven introduction to its potential application to neurology and psychiatry. The more sophisticated readers, particularly those from nuclear medicine who have been active in functional brain imaging, will come away from the book feeling a bit let down.

A strong summary article, bringing the major points of the papers together and suggesting further directions, would have been a valuable addition. For all of its shortcomings, this volume adds to the growing body of published symposia on functional brain imaging. The first group of papers best serves those in nuclear medicine who are just beginning to work

in brain imaging. The second set shows nuclear medicine's contributions to neurology and psychiatry.

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Edeiken's Roentgen Diagnosis of Diseases of Bone, 4th Edition

J. Edeiken, M. Dalinka, D. Karasick, Williams & Wilkins, Baltimore, 2 vols., 1900 pp, \$195.00.

This is the fourth edition of this classic text, whose earlier editions have established it as one of the standard textbooks of skeletal radiology. The update is timely, following by nine years the publication of the third edition. During this interval much has changed in the field of skeletal radiology. Magnetic resonance imaging (MRI) and computed tomography (CT) have become standard components of the orthopedic imaging workup and clinical advances in the classification and treatment of bone tumors, arthritides and metabolic bone disease have necessitated a revised treatment of these topics.

This two-volume work stands in the intermediate size-range of skeletal radiology textbooks, smaller than the massive six-volume tome by Resnick and Niwayama and larger than the text by Greenfield. The coverage is broad, but not exhaustive. Bone and soft-tissue tumors receive the most extensive treatment, followed by the arthritides, metabolic bone disease and osteomyelitis. Sports medicine and general orthopedic trauma are not covered.

The book is an excellent reference source for both the radiographic and medical-surgical aspects of bone radiology. The reproductions are of good quality and the discussions are excellent, generally inclusive of knowledge through 1986-1987. A foldout chart of epiphyseal ossification centers will prove useful to nuclear medicine practitioners interpreting pediatric studies. MRI and CT applications are well represented and knowledgeably discussed. Perhaps the weakest point of the text is the treatment of the integration of radionuclide studies in the diagnostic evaluation. Few radionuclide images are presented and the discussions of