NUCLEAR MEDICINE: CARDIOLOGY (TOPIC 5: MYOCARDIAL PERFUSION SCINTIGRAPHY—TECHNICAL ASPECTS)

E.H. Botvinich, editor. Reston, VA: Society of Nuclear Medicine, Inc., 2001, 218 pages, $119

This easy-to-understand book, which is part of the Self-Study Program III of the Society of Nuclear Medicine, is a good review of the basic technical aspects of myocardial perfusion scintigraphy and also the technical aspects of ^{18}F-FDG imaging with gamma cameras. For physicians, the book provides basic essentials about performing myocardial perfusion scintigraphy and avoiding potential errors in interpretation. For technologists, the book is comprehensive, covering everything from stress testing to the most common artifacts seen on a perfusion study. It can be used as a reference guide for day-to-day imaging.

The text opens with a synopsis of the evolution of nuclear cardiology and then continues into a descriptive explanation of coronary blood flow. In this section, the author provides a thorough and understandable definition of coronary blood flow and an overview of its basic physiology and abnormal states. The next section focuses on radionuclides and examines the relationship of each perfusion tracer to coronary blood flow, including linearity and extraction fraction. The imaging characteristics and basic kinetics of the individual tracers are also discussed.

A section follows on the technical aspects of myocardial perfusion scintigraphy using gated SPECT. After an in-depth survey of the technique, the author discusses the potential pitfalls of this method and variability in the measurement of perfusion and function.

The next 4 sections are on performing myocardial perfusion scintigraphy. These include stress testing protocols, imaging protocols, image acquisition, and image processing and quantification. In the section about stress protocols, the author briefly discusses exercise stress testing and the effect of certain medications on the results. Pharmacologic stress testing using vasodilators is also briefly reviewed. The section about imaging protocols is essentially divided into 3 parts, 1 each on ^{201}Tl, ^{99m}Tc-labeled isotopes, and dual-isotope protocols. Each section explains the advantages and limitations of each protocol and how each should be performed. The section about image acquisition contains details on both planar and SPECT acquisitions. In the section on image processing and quantitation, the author carefully presents the principles of image display, reviews the software currently available, and summarizes sources of error in quality control that may be visualized during processing. These inclusive sections give the reader a basic understanding of what needs to be considered during acquisition and processing.

After the 4 sections on performing myocardial perfusion scintigraphy is a section that reviews the most common artifacts for both planar and SPECT imaging. The author discusses normal cardiac variants; attenuation, scatter, and artifacts; and errors during image interpretation. This section is important for both technologists and physicians.

The text closes with 2 sections, one addressing the use of ^{18}F-FDG imaging with conventional SPECT cameras and one addressing the current and future states of nuclear cardiology. These sections make up an informative closing to a thorough review of the technical aspects of SPECT imaging.

After an extensive list of references, challenging questions and case examples are presented. These give readers the opportunity to test their knowledge and comprehension of the information presented. The answers for each question are given and thoughtfully discussed.

In summary, this publication offers an in-depth review of the technical aspects of myocardial perfusion imaging. It provides the reader with a comprehensive overview on how to achieve the best-quality studies possible and methods and suggestions to recognize and avoid potential artifacts that can result in false-positive findings. This text should be a must-read for both physicians and technologists performing myocardial perfusion imaging.

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