

CLINICAL PET

Developments in Nuclear Medicine

VOLUME 28

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Clinical PET

edited by

R. BARES

*Department of Nuclear Medicine,
Eberhard-Karls-University, Tuebingen, Germany*

and

G. LUCIGNANI

*INB-CNR, Department of Nuclear Medicine,
University of Milan, Scientific Institute H.S.,
Raffaele, Milan, Italy*



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FOREWORD

The 1994 Convention of the European Association of Nuclear Medicine (EANM) in Düsseldorf, Germany (Aug. 20 - 24) was preceded by five pre-congress meetings. One of these was headlined "Clinical PET" and was most successfully organized by Roland Bares, Aachen (G) and Giovanni Lucignani, Milano (I). As the congress president, I felt very happy that it clearly was aimed at the clinical benefit of PET methods and at employment of this most elegant method in three important fields of patients care, viz. cardiology, neurology and oncology. Organizers, chairmen and speakers belong to the upcoming generation of young but already highly qualified nuclear physicians and physicists in Europe and Japan. Experienced physicians, they may be addressed as critical PET-users, added their view of patients demands.

PET started in the late seventies by combining physicists, chemists, physicians and engineers to bring cyclotron, radiochemistry, PET scanner and mathematical modelling into function (PET center). In the eighties, PET was further developed in some few research centers, employed in man to answer questions of fundamental interest and concern. However, as a logic consequence of physiological research in normals, followed by pathophysiologically guided research in selected patients, such "clinical research" has to end up in serious and critical clinical employment. This has first been restricted to some rather special clinical constellations as in some brain diseases. The next step gave insight into the heart and into coronary artery disease. Subsequently, it was found that PET may be employed in two conditions, viz. in PET centers and in satellite PET stations (PET scanner located in large university departments of nuclear medicine in proximity to a PET center, supported from there with transportable radiopharmaceuticals) as well. PET studies became larger, more clinically and benefit oriented, as for instance in hibernating myocardium. Furthermore, now based on the body of knowledge of medical faculties, they were used to test and to elucidate fields of proved indication in patients. Thus, PET left its former ivory tower. During the last years, oncologic questions were addressed and most elegantly answered also by employing satellite PET.

Today we face three areas of significance for PET, viz. basic research, clinical research and clinical employment. For the latter, development of powerful workstations yielded to combine PET data with SPECT data sets and to merge such slices of function with morphologically oriented slices from MRI or CT. This is a unique advantage if PET is intergrated into an university hospital. Diagnostic impact, therapy monitoring and prognosis are the goals for PET studies in such clinical environment. As in all nuclear procedures, radiation protection and quality assurance have to be considered.

However, if a method becomes a clinical tool, it has to face critical evaluation by stake holders and interested parties. Results and costs have to be compared to other diagnostic modalities. Referring physicians, health economists and official bodies have to be convinced of its clinical power.

The present book summarizes the lectures, given at this well frequented pre-congress meeting, comprising basic pathophysiology, clinical demands for PET and clinical results of PET procedures in patients, already confirmed and widely accepted. It further illuminates future clinical goals to be reached if the most significant strategy is kept in mind. i.e. PET acts as a tool for both, researchers and physicians. I hope that this message is carried out through this publication.

Prof. Dr. U. Buell
EANM Congress President , 1994

PREFACE

During the past decade Positron Emission Tomography (PET) has turned from a highly sophisticated tool developed for basic research in neurology and cardiology into an advanced nuclear medicine imaging technique ready for routine use. Along with remarkable technical improvements an overwhelming number of PET studies has been published covering not only scientific but also relevant clinical problems. Due to this rapid development comprehensive information about the current status of “clinical” PET is missing. It is the aim of this book to provide a critical overview about relevant applications of PET for all those who are beginning to run a PET facility or are planning to do so. Furthermore the book is dedicated to interested clinicians who are willing to utilize the diagnostic potential of PET.

In this book the applications of PET in neurology, cardiology, and oncology are discussed in three sections. In each section, following an introduction reviewing the present clinical demands, special diagnostic problems and their possible solution by PET are addressed. Results of conventional scintigraphic techniques are mentioned, too, and compared with PET. In a fourth section technical aspects (e.g. instrumentation, software) are presented including statements of representatives of leading manufacturers in the field of PET; readers willing to learn about PET radiopharmaceuticals will find in another recent book of this series an extensive review.

Since all of the papers were presented during the meeting “Clinical PET” held in Düsseldorf prior to the 1994 annual meeting of the European Association of Nuclear Medicine, they reflect current knowledge and state of the art information about this most exciting new field of Nuclear Medicine. We hope the readers will enjoy the book and take maximum profit from it for their personal work and an optimized patient care.

Roland Bares and Giovanni Lucignani
Tübingen and Milano, April 1996

LIST OF CONTRIBUTORS

Roland B. Bares Department of Nuclear Medicine, Eberhard-Karls-University, Roentgenweg 13, D-72076 Tübingen, Germany

Udalrich Buell Department of Nuclear Medicine, Technical University, Pauwelstrasse 30, D-52057 Aachen, Germany

Maike De Wit Department of Oncology and Hematology, University Hospital Eppendorf, Martinistrasse 52, D-20246 Hamburg, Germany

Ulrich Feine Department of Nuclear Medicine, Eberhard-Karls-University, Roentgenweg 13, D-72076 Tübingen, Germany

Co-authors: Roland Lietzenmayer and Wolfgang Mueller-Schauenburg

Karl Herholz Max Planck-Institute for Neurological Research, Gleueler Str. 50, D-50931 Cologne, Germany

Andy Holley General Electrics Medical Systems, Coolidge House, 352 Buckingham Avenue, Slough, Berkshire SL1 4ER, U.K.

Kazuo Kubota Department of Nuclear Medicine & Radiology, Institute for Development, Aging and Cancer, Tohoku University, 4-1 Seiryomachi Aobaku, SENDAI, Miyagi 0980-77, Japan

Co-authors: Susumu Yamada, Masatoshi Ito, Kenji Yamada, Takehiko Fujiwara, Roko Kubota, Kiichi Ishiwata, Hiroshi Fukuda, Taiju Matsuzawa, Masao Tada and Tatsuo Ido

Giovanni Lucignani Department of Nuclear Medicine, University of Milan, H.S. Raffaele, Via Olgettina 60, I- 20132 Milan, Italy

Jacques A. Melin Laboratory for Positron Emission Tomography, University of Louvain Medical School, Chemin du Cyclotron 2, B-1348 Louvain La Neuve, Belgium

Co-authors: Jean-Louis Vanoverschelde, Bernhard Gerber, Christian Michel, William Wijns and Anne Bol

Stefan P. Mueller Department of Nuclear Medicine, University Hospital Essen, Hufelandstrasse 55, D-45147 Essen, Germany

Hartwig Newiger Siemens Medical Systems AG, Nuclear Medicine, P.O. Box 3250, D-91050 Erlangen, Germany

Bernard Sadzot Department of Neurology, Cyclotron Research Center, University of Liege Sart Tilman, B- 4000 Liège 1, Belgium

Co-authors: René M.C. Debets, Eric Salmon, Cornelius W.M. van Veelen, Guy Delfiore, Alexander C. van Huffelen and George Franck

Christiaan Schiepers Department of Nuclear Medicine, University Hospital Gasthuisberg, Herestraat 49, B-3000 Leuven, Belgium

Udo Sechtem Department of Internal Medicine III, University of Cologne, Joseph-Stelzmann-Strasse 9, D- 50924 Cologne, Germany

Co-authors: Christian A. Schneider, Eberhard Voth and Harald Schicha

Ludwig G. Strauss Department of Oncologic Diagnosis and Therapy, German Cancer Research Center, Im Neuenheimer Feld 280, D-69120 Heidelberg, Germany

Juergen vom Dahl Department of Internal Medicine I (Cardiology), Technical University of Aachen, Pauwelstrasse 30 , D-52057 Aachen, Germany

Cornelis Weiller Department of Neurology, University Hospital Essen, Hufelandstrasse 55, D-45122 Essen, Germany