
Diseases of the Brain, Head & Neck, Spine 2012-2015
Diagnostic Imaging and Interventional Techniques

J. Hodler • G.K. von Schulthess • Ch.L. Zollikofer (Eds)

DISEASES OF THE BRAIN, HEAD & NECK, SPINE 2012-2015

DIAGNOSTIC IMAGING AND INTERVENTIONAL TECHNIQUES

**44th International Diagnostic Course
in Davos (IDKD)
*Davos, March 25-30, 2012***

including the

Nuclear Medicine Satellite Course "Diamond"
Davos, March 24-25, 2012

Pediatric Radiology Satellite Course "Kangaroo"
Davos, March 24-25, 2012

Breast Imaging Satellite Course
Davos, March 24-25, 2012

and additional IDKD Courses 2012-2015

presented by the Foundation for the
Advancement of Education in Medical Radiology, Zurich

 Springer

Editors

J. HODLER
Radiology
University Hospital
Zurich, Switzerland

G. K. VON SCHULTHESS
Nuclear Medicine
University Hospital
Zurich, Switzerland

CH. L. ZOLLIKOFER
Kilchberg/Zurich, Switzerland

ISBN 978-88-470-2627-8

ISBN 978-88-470-2628-5 (eBook)

DOI 10.1007/978-88-470-2628-5

Springer Milan Dordrecht Heidelberg London New York

Library of Congress Control Number: 2012932594

© Springer-Verlag Italia 2012

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Cover design: Simona Colombo, Milan, Italy
Typesetting: C & G di Cerri e Galassi, Cremona, Italy
Printing and binding: Grafiche Porpora, Segrate (MI), Italy
Printed in Italy

Springer-Verlag Italia S.r.l., Via Decembrio 28, 20137 Milan

Springer is a part of Springer Science+Business Media (www.springer.com)

Preface

The International Diagnostic Course in Davos (IDKD) offers a unique learning experience for imaging specialists in training as well as for experienced radiologists and clinicians wishing to be updated on the current state of the art and the latest developments in the fields of imaging and image-guided interventions.

This annual course deals with neuroimaging of the brain, head, neck, and spine. During the last few years, there have been considerable advances in this subject, driven by clinical as well as technological developments. The authors, internationally renowned experts in their field, have contributed chapters that are disease-oriented and cover all relevant imaging modalities, including magnetic resonance imaging, computed tomography, and positron emission tomography.

As a result, this book offers a comprehensive review of the state-of-the art in neuroimaging. It is particularly relevant for general radiologists, radiology residents, neurologists, neurosurgeons, and other clinicians wishing to update their knowledge in this discipline.

The Syllabus is designed to be an *aide-mémoire* for the course participants so that they can fully concentrate on the lectures and participate in the discussions without the need of taking notes.

Additional information can be found on the IDKD website: www.idkd.org

J. Hodler
G.K. von Schulthess
Ch.L. Zollikofer

Table of Contents

Workshops

Brain Tumors	3
Edmond A. Knopp, Walter Montanera	
Mass Lesions of the Brain: A Differential Diagnostic Approach	14
Michael Brant-Zawadzki	
Differential Diagnosis of Brain Masses	16
James G. Smirniotopoulos, Steven J. Goldstein	
Evaluation of Cerebral Vessels	21
Robert A. Willinsky	
Evaluation of the Cerebral Vessels: Endovascular Therapy	27
Mary E. Jensen	
Brain Ischemia: CT and MRI Techniques in Acute Stroke	37
Jens Fiehler, Howard A. Rowley	
Hemorrhagic Vascular Pathologies, I	45
James Byrne	
Hemorrhagic Vascular Pathologies, II	48
Martin Wiesmann	
Demyelinating Diseases	50
Kelly K. Koeller, Frederik Barkhof	
Degenerative Brain Disease and Aging	58
Marco Essig, Mark A. van Buchem	
Neuroradiological Diagnosis of Craniocerebral Trauma: Current Concepts	67
Paul M. Parizel, C. Douglas Phillips	
Nontraumatic Neuroemergencies, I	78
Patrick A. Brouwer	
Nontraumatic Neuroemergencies, II	82
John R. Hesselink	
Epilepsy and Neuroimaging	89
Linda J. Bagley, Timo Krings	
Infectious Diseases of the Central Nervous System	99
Vincent Dousset, Alain Bonafé	

Cerebral Infections	107
David J. Mikulis	
Diseases of the Sella and Parasellar Region	115
Walter Kucharczyk, Charles L. Truwit	
Temporal Bone and Auditory Pathways	122
Jan W. Casselman, Francis Veillon	
Imaging Diseases of the Pharynx and Oral Cavity	130
Wendy R.K. Smoker, Bernhard Schuknecht	
Diseases of the Larynx	143
Martin G. Mack, Hugh D. Curtin	
Extramucosal Spaces of the Suprahyoid Neck	148
Laurie A. Loevner	
Sinonasal Imaging	152
David M. Yousem	
Degenerative Disc Disease of the Spine: Anatomic and Imaging Considerations	162
Michael T. Modic, Christian W.A. Pfirrmann	
Acute Spinal Trauma	167
Pia C. Sundgren, Adam E. Flanders	
Spinal Cord Inflammatory and Demyelinating Diseases	173
Majda M. Thurnher	
Spinal Inflammatory and Infectious Diseases	177
Jeffrey S. Ross	
Congenital and Acquired Abnormalities of the Pediatric Brain	188
William S. Ball, Thierry A.G.M. Huisman	
Imaging of Pediatric Brain and Spinal Cord Tumors	203
Tina Young Poussaint, Andrea Rossi	

Nuclear Medicine Satellite Course **Diamond**



Imaging Alzheimer in 2011	217
Marieke Hazewinkel, Frederik Barkhof	
Quantification of NeuroPET: When to Use It	220
Alfred Buck	
Radioiodine Therapy: Current Imaging Concepts Introduction	224
Luca Giovanella	
Nuclear Medicine Imaging of Brain Tumors	231
Ian Law	
Nuclear Imaging of Neurovascular Disease	235
Ian Law	

Integrated PET-CT and PET-MR: Pitfalls and Applications in Head and Neck Squamous Cell Carcinoma	238
Laurie Loevner	
PET Imaging of Dementia	244
Osama Sabri, Solveig Tiepolt, Swen Hesse, Henryk Barthel	
Clinical SPECT and PET for Management of Patients with Refractory Epilepsy	251
Koen Van Laere, Karolien Goffin, Wim Van Paesschen	
Pediatric Satellite Course Kangaroo	
Hemorrhage, Stroke, and Ischemia of the Neonatal Brain	263
Maria I. Argyropoulou	
Accidental and Nonaccidental Injury of the Pediatric Brain and Spine	268
Thierry A.G.M. Huisman	
Acquired Infectious and Autoimmune Diseases of the Pediatric Central Nervous System	280
Andrea Rossi	
Imaging of the Phakomatoses in Children	296
Tina Young Poussaint	
Breast Imaging Satellite Course	
MRI of the Breast: Technique, Indications, and BI-RADS Classification	305
Karen Kinkel	
Microcalcifications of the Breast: An Approach to Radiologic Classification	307
Markus Müller-Schimpfle	
Ultrasound of the Breast, Including Interventions: An Update	311
Alexander Munding	
Mammography: Diagnosis of Asymmetries, Masses and Architectural Distortion	318
Christian Weismann	
Appendix: Full Color Figures	323

List of Contributors

- Argyropoulou M.I., 263
Bagley L.J., 89
Ball W.S., 188
Barkhof F., 50, 217
Barthel H., 244
Bonafé A., 99
Brant-Zawadzki M., 14
Brouwer P.A., 78
Buchem van M.A., 58
Buck A., 220
Byrne J., 45
Casselmann J.W., 122
Curtin H.D., 143
Dousset V., 99
Essig M., 58
Fiehler J., 37
Flanders A.E., 167
Giovanella L., 224
Goffin K., 251
Goldstein S.J., 16
Hazewinkel M., 217
Hesse S., 244
Hesselink J.R., 82
Huisman T.A.G.M., 188, 268
Jensen M.E., 27
Kinkel K., 305
Knopp E.A., 3
Koeller K.K., 50
Krings T., 89
Kucharczyk W., 115
Laere van K., 251
Law I., 231, 235
Loevner L.A., 148, 238
Mack M.G., 143
Mikulis D.J., 107
Modic M.T., 162
Montanera W., 3
Müller-Schimplé M., 307
Mundinger A., 311
Paesschen van W., 251
Pfirschmann C.W.A., 162
Parizel P.M., 67
Phillips C.D., 67
Ross J.S., 177
Poussaint T.Y., 203, 296
Rossi A., 203, 280
Rowley H.A., 37
Sabri O., 244
Smoker W.R.K., 130
Schuknecht B., 130
Smirniotopoulos J.G., 16
Sundgren P.C., 167
Thurnher M.M., 173
Tiepol S., 244
Truwit C.L., 115
Veillon F., 122
Weismann C., 318
Wiesmann M., 48
Willinsky R.A., 21
Yousem D.M., 152