

MULTISLICE COMPUTED TOMOGRAPHY

A Practical Approach to Clinical Problems



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Multislice Computed Tomography A Practical Approach To Clinical Protocols

Paul M. Silverman



Multislice Computed Tomography A Practical Approach To Clinical Protocols:

Multislice Computed Tomography Paul M. Silverman, 2002 From the author of our best selling handbook on helical spiral CT comes a brand new indispensable practical guide to the next generation of technology multislice or multidetector CT Dr Silverman and his renowned colleagues present detailed easy to follow scanning protocols for all areas of the body for pediatric examinations and for three dimensional imaging and explain the principles behind the protocols Multislice CT scanning protocols for specific clinical indications are presented in the same user friendly outline format as in Dr Silverman's other handbook Representative images appear on the page opposite each protocol The author's terminology allows the protocols to be used with equipment from any manufacturer *Multislice CT: A Practical Guide* B. Marincek, P.R. Ros, M. Reiser, M.E. Baker, 2012-12-06 Until recently CT scanner performance was limited by a series of compromises With single detector scanners one cannot select thin collimation and still maintain the required extent of volumetric coverage Slow scans cause motion artifacts that impair image quality The introduction of multidetector CT technology however has revolutionized the field Currently multidetector multislice CT scanners acquire up to four channels of data from interweaving spirals The minimum gantry rotation period is as low as half of a second This increased scan speed allows for thinner collimation and thus higher longitudinal or z axis resolution in comparison with single detector CT The improved image quality with multidetector technology leads to new applications of CT particularly in cardiac vascular and abdominal imaging On going clinical studies are evaluating the suitability of this new imaging tool for non invasive screening and diagnosis of coronary artery disease A particular advantage to the increased scan speed in vascular imaging is the ability to cut intra venous contrast dosage and still maintain peak enhancement CT throughout the entire acquisition Thin section multiphasic acquisition during optimal arterial phase and venous phase enhancement significantly improves the accuracy for small lesion and vessel detection and enhances overall classification of abdominal neoplasms On the other hand the increasingly large volume data sets force to new ways of looking at presenting storing and transferring images Networking and two and three dimensional data processing are the key words Multislice CT Claus D. Claussen, E.K. Fishman, B. Marincek, M. Reiser, 2012-12-06 The 6th International SOMATOM CT Scientific User Conference was held in Tiibingen on September 27 and 28 2002 under the auspices of the Eberhard Karls University Tiibingen the University Hospital Zurich the Ludwig Maximilians University Munich and the Johns Hopkins University Baltimore Siemens AG Medical Solutions Forchheim was again very gracious in sponsoring the course and the associated events There have been remarkable achievements in CT technology workflow management and applications since the last SOMATOM user conference in Zurich in June 2000 The next generation of multidetector row CT now capable of acquiring 16 slices during a single rotation has been introduced The meeting in Tiibingen was the very first conference where research groups from all over the world were presenting their very first results with this new technology in the various fields of CT imaging It became obvious that these new technical possi

bilities will again have significant impact on the clinical use of CT Tiibingen offered a special and inspiring atmosphere for the meeting an atmosphere which has been preserved throughout time For more than 500 years the university one of the oldest in Germany has been a source for new ideas being pursued by famous philosophers poets and scientists such as H6lderlin Morike Hegel Schelling Kepler Butenandt and many more *Spiral and Multislice Computed Tomography of the Body* Mathias Prokop, Michael Galanski, 2011-01-01 All you need to know to maximize the diagnostic capabilities of CT Whole body computed tomography has developed at a rapid pace in the past decade spurred on by the introduction of spiral and multislice scanning These new technologies have not only improved diagnostic accuracy but also made new applications possible that were previously accessible only through more complex or invasive techniques This new book expertly fills a gap in the literature by combining the practically relevant technical background with the clinical information required for correctly performing and interpreting CT examinations The book presents the state of the art capabilities and requirements of CT as a key diagnostic and interventional tool with special emphasis on the role of spiral and multi slice CT You will find a thorough introduction to CT technology from scanner design to 3D image reconstruction useful practical hints on how to optimize your examination protocols and how to keep the radiation exposure of your patients to a minimum as well as an extensive clinical section in which symptoms pathology and CT morphology are integrated to provide you with the basis for subtle interpretation of CT findings using the most modern CT techniques Highlights include Full coverage of single slice 4 slice and 16 slice scanning techniques Introduction to extended CT applications including cardiac CT CT fluoroscopy and 3D image processing Organ specific protocols for scanning and contrast administration Practical guidelines for maximizing image quality and minimizing radiation exposure Useful suggestions for image interpretation and for avoiding pitfalls and errors Convenient format by organ system and disease entity Full discussion of organ specific pathology and CT morphology CT indications integrated with other imaging modalities At a time when CT examinations are becoming more technically demanding and complex with an increasing number of scan parameters and advances in 3D reconstructions this book is an essential professional tool Experienced practitioners will find their diagnostic and technical skills improved by reading the book and beginners will enjoy the clear systematic approach that will help them use the technique with confidence

Multislice CT Claus D Claussen, E. K. Fishman, B. Marincek, 2003-11-27 Protocols for Multislice Helical Computed Tomography Dawson Peter, 2006-01-17 Despite the expected decline in the mid 1970s in the use of computed tomography CT following the excitement of magnetic resonance imaging MRI CT has confounded its detractors and remains the imaging modality of choice particularly for the chest and abdomen Spiral helical CT with the development of 64 multislice variant has revolutionized diagnostic imaging image acquisition of large body volumes are obtained in short times during a single breath hold Scanning protocols without contrast enhancement are not a challenge however with intravenous contrast agents critical choices are made and bad choices inevitably produce bad scans This handy guide provides the reader with a simple

introduction to the essential ideas involved and a practical guide to the implementation of rational scanning protocols for multislice spiral instruments Written by Peter Dawson a well respected figure in computed tomography and radiology and a world expert on contrast agents Scanning Protocols for Multislice Helical Computed Tomography is an essential guide for all those working with CT as well as those in training **Helical (spiral) Computed Tomography** Paul M. Silverman,1995

Multislice CT Maximilian Reiser,Tatuo Banno,2003-01-01 This second revised edition of Multislice CT provides a comprehensive overview of the clinical application of this exciting technique following the introduction of the newest generation of multi detector row CT scanners An initial section considers technical aspects and issues including those relating to radiation dose and use of contrast material Thereafter the focus is on the diagnostic applications of multislice CT in each of the most important anatomical regions Examinations of the abdomen head and neck brain chest and blood vessels are individually described and illustrated due attention being paid to the special scanner settings necessary in each case Practical guidelines to the performance of a successful investigation are provided and each chapter also reviews the most recently published literature This comprehensive book will be an invaluable asset to radiologists at all levels Book jacket

Illustrated Computer Tomography S. Takahashi,S. Sakuma,M. Kaneko,2012-12-06 In spring this year it will be 35 years since I began to study rotation technique as applied to radiology In 1947 the name rotation radiography was publicly adopted for the application of this technique to roentgenography Since then our study has revealed that the technique in presenting the axial transverse cross section figure is valuable not only in diagnosis but also in radiotherapy Our books on Conformation Radiotherapy Rotation Technique as Applied to Radiography and Radiotherapy of Cancer and An Atlas of Axial Transverse Tomography and its Clinical Application were published by Acta Radiologica Stockholm in 1965 and Springer Verlag in 1969 respectively Having excellent contrast resolution computed tomography can be considered an advanced type of rotation radiography With this in mind I planned to edit and publish the Illustrated Computer Tomography as the latest presentation in a series of publications on rotation radiography The editor would like to express his deep appreciation to the contributors to this book as well as to the publishers Shujunsha Japan and Springer Verlag Spring 1983 SHINJI TAKAHASHI Contents Introduction By S TAKAHASHI 1 Part I Basic Aspects of Computed Tomography Debut and Spread By S

TAKAHASHI **Multislice CT** Maximilian F Reiser,Mutsumasa Takahashi,Michael Modic,Christoph R. Becker,2013-06-29 This is the second revised edition of the very successful volume on multislice CT published only 2 years ago A second edition became necessary so swiftly due to the rapid technical developments in multi detector row technology a huge amount of new experimental and clinical data has recently become available This book is the most comprehensive up to date work on all aspects of the clinical applications of this fascinating imaging technique It contains information on the very latest developments in the field as well as numerous superb illustrations I am very much indebted to the editors of this volume M F Reiser M Takahashi M Modic and C R Becker all renowned international experts in computer tomography for the immense

dedication and tireless effort involved in preparing and editing this superb volume in a record brief period of time I would like to congratulate the editors and the contributing authors all selected for their exceptional expertise on the outstanding quality of the different chapters and the wide range of topics covered Protocols for Multislice Helical Computed Tomography Dawson Peter,2019-08-30 Despite the expected decline in the mid 1970s in the use of computed tomography CT following the excitement of magnetic resonance imaging MRI CT has confounded its detractors and remains the imaging modality of choice particularly for the chest and abdomen Spiral helical CT with the development of 64 multislice variant has revolutionized diagnostic imaging image acquisition of large body volumes are obtained in short times during a single breath hold Scanning protocols without contrast enhancement are not a challenge however with intravenous contrast agents critical choices are made and bad choices inevitably produce bad scans This handy guide provides the reader with a simple introduction to the essential ideas involved and a practical guide to the implementation of rational scanning protocols for multislice spiral instruments Written by Peter Dawson a well respected figure in computed tomography and radiology and a world expert on contrast agents Scanning Protocols for Multislice Helical Computed Tomography is an essential guide for all those working with CT as well as those in training Computed Tomography - E-Book Euclid Seeram,2015-09-02 Build the foundation necessary for the practice of CT scanning with Computed Tomography Physical Principles Clinical Applications and Quality Control 4th Edition Written to meet the varied requirements of radiography students and practitioners this two color text provides comprehensive coverage of the physical principles of CT and its clinical applications Its clear straightforward approach is designed to improve your understanding of sectional anatomic images as they relate to CT and facilitate communication between CT technologists and other medical personnel Comprehensively covers CT at just the right depth for technologists going beyond superficial treatment to accommodate all the major advances in CT One complete CT resource covers what you need to know The latest information on advances in CT imaging including advances in volume CT scanning CT fluoroscopy multi slice applications like 3 D imaging CT angiography and virtual reality imaging endoscopy all with excellent coverage of state of the art principles instrumentation clinical applications and quality control More than 600 photos and line drawings help students understand and visualize concepts Chapter outlines show you what is most important in every chapter Strong ancillary package on Evolve facilitates instructor preparation and provides a full complement of support for teaching and learning with the text NEW Highlights recent technical developments in CT such as the iterative reconstruction detector updates x ray tube innovations radiation dose optimization hardware and software developments and the introduction of a new scanner from Toshiba NEW Learning Objectives and Key Terms at the beginning of every chapter and a Glossary at the end of the book help you organize and focus on key information NEW End of Chapter Questions provide opportunity for review and greater challenge NEW An added second color aids in helping you read and retain pertinent information MDCT: A Practical Approach S. Saini,G.D. Rubin,M.K. Kalra,2014-12-13 This book describes current

examination techniques and advanced clinical applications of state of the art multidetector computed tomography MDCT scanners There are contributions from several distinguished radiologists and clinicians Each chapter is written from a practical perspective so that radiologists residents medical physicists and radiology technologists can obtain relevant information about MDCT applications **Protocols for Multislice CT** Roland Bruening,Thomas Flohr,2013-04-17

Multislice technology has made it possible to investigate large sections of the human body in a very short time The 4 and 16 row systems currently available necessitate the use of new protocols which are proposed herein In a convenient double page layout this book provides structured information on all routine protocols to be used for multislice CT The volume covers all investigations of the brain neck lung and chest abdomen and the periphery as well as special protocols for the heart for CT angiography and for CT guided interventions Each protocol is displayed en bloc enabling rapid appreciation of the scanner settings and the indications **Multislice CT** Maximilian Reiser,2004 This second revised edition of Multislice CT provides a comprehensive overview of the clinical application of this exciting technique following the introduction of the newest generation of multi detector row CT scanners An initial section considers technical aspects and issues including those relating to radiation dose and use of contrast material Thereafter the focus is on the diagnostic applications of multislice CT in each of the most important anatomical regions Examinations of the abdomen head and neck brain chest and blood vessels are individually described and illustrated due attention being paid to the special scanner settings necessary in each case Practical guidelines to the performance of a successful investigation are provided and each chapter also reviews the most recently published literature This comprehensive book will be an invaluable asset to radiologists at all levels

Multidetector-Row Computed Tomography G. Marchal,J P. Heiken,2005-03-04 Section I Principles and challenges of MDCT Introduction I 1 MDCT Technical principles and future trends I 2 Contrast medium administration and scan timing for MDCT Section II Abdominal imaging Introduction II 1 MDCT Secondary malignancies and benign liver lesions II 2 Primary liver malignancies II 3 MDCT of the pancreas II 4 Abdominal imaging Use of high concentration contrast media Section III Cardiac and vascular imaging Introduction III 1 Use of high concentration contrast media in CT angiography Principles and rationale III 2 Cardiac and vascular imaging Cardiology indications III 3 Aorta peripheral and renal vessels III 4 MDCT for diagnosis of pulmonary embolism Have we reached our goal Section IV Future prospects in MDCT imaging Introduction IV 1 Interventional MDCT IV 2 Functional CT imaging in stroke and oncology IV 3 From acquisition to report managing the information overload IV 4 Recent update on contrast media safety **Illustrated Computer Tomography** S. Takahashi,S. Sakuma,M. Kaneko,2011-12-25 In spring this year it will be 35 years since I began to study rotation technique as applied to radiology In 1947 the name rotation radiography was publicly adopted for the application of this technique to roentgenography Since then our study has revealed that the technique in presenting the axial transverse cross section figure is valuable not only in diagnosis but also in radiotherapy Our books on Conformation Radiotherapy Rotation Technique as

Applied to Radiography and Radiotherapy of Cancer and An Atlas of Axial Transverse Tomography and its Clinical Application were published by Acta Radiologica Stockholm in 1965 and Springer Verlag in 1969 respectively Having excellent contrast resolution computed tomography can be considered an advanced type of rotation radiography With this in mind I planned to edit and publish the Illustrated Computer Tomography as the latest presentation in a series of publications on rotation radiography The editor would like to express his deep appreciation to the contributors to this book as well as to the publishers Shujunsha Japan and Springer Verlag Spring 1983 SHINJI TAKAHASHI Contents Introduction By S TAKAHASHI 1 Part I Basic Aspects of Computed Tomography Debut and Spread By S TAKAHASHI *Multislice CT* Friedrich Knollmann, Fergus Coakley, 2006 A team of international experts provides a hands on evidence based overview of the latest clinical applications of multislice computed tomography Each chapter begins with standard examination protocols for a particular body area and then provides detailed explanations of the key parameter choices for each scanner type with supportive data from the available literature wherever possible The result is today's state of the art definitive guide to the cost effective use of this revolutionary new technology Offers a complete overview of the most important applications of multislice computed tomography for all body areas Organizes information in a head to toe format making guidance quick and easy to find Features abundantly illustrated guidance with many color 3 D images Presents up to date coverage based upon the most recent technology from 4 row to 64 row CT systems Includes the latest information on contrast agents and equipment protocols Also includes Multislice CT Angiography the most advanced technique in vascular imaging Covers the latest interventional procedures guided by MSCT 3D Image Reconstruction for CT and PET Daniele Panetta, Niccolo Camarlinghi, 2020-10-11 This is a practical guide to tomographic image reconstruction with projection data with strong focus on Computed Tomography CT and Positron Emission Tomography PET Classic methods such as FBP ART SIRT MLEM and OSEM are presented with modern and compact notation with the main goal of guiding the reader from the comprehension of the mathematical background through a fast route to real practice and computer implementation of the algorithms Accompanied by example data sets real ready to run Python toolsets and scripts and an overview the latest research in the field this guide will be invaluable for graduate students and early career researchers and scientists in medical physics and biomedical engineering who are beginners in the field of image reconstruction A top down guide from theory to practical implementation of PET and CT reconstruction methods without sacrificing the rigor of mathematical background Accompanied by Python source code snippets suggested exercises and supplementary ready to run examples for readers to download from the CRC Press website Ideal for those willing to move their first steps on the real practice of image reconstruction with modern scientific programming language and toolsets Daniele Panetta is a researcher at the Institute of Clinical Physiology of the Italian National Research Council CNR IFC in Pisa He earned his MSc degree in Physics in 2004 and specialisation diploma in Health Physics in 2008 both at the University of Pisa From 2005 to 2007 he worked at the

Department of Physics E Fermi of the University of Pisa in the field of tomographic image reconstruction for small animal imaging micro CT instrumentation His current research at CNR IFC has as its goal the identification of novel PET CT imaging biomarkers for cardiovascular and metabolic diseases In the field micro CT imaging his interests cover applications of three dimensional morphometry of biosamples and scaffolds for regenerative medicine He acts as reviewer for scientific journals in the field of Medical Imaging Physics in Medicine and Biology Medical Physics Physica Medica and others Since 2012 he is adjunct professor in Medical Physics at the University of Pisa Niccol Camarlinghi is a researcher at the University of Pisa He obtained his MSc in Physics in 2007 and his PhD in Applied Physics in 2012 He has been working in the field of Medical Physics since 2008 and his main research fields are medical image analysis and image reconstruction He is involved in the development of clinical pre clinical PET and hadron therapy monitoring scanners At the time of writing this book he was a lecturer at University of Pisa teaching courses of life sciences and medical physics laboratory He regularly acts as a referee for the following journals Medical Physics Physics in Medicine and Biology Transactions on Medical Imaging Computers in Biology and Medicine Physica Medica EURASIP Journal on Image and Video Processing Journal of Biomedical and Health Informatics

Multi-slice CT in Cardiac Imaging Bernd M. Ohnesorge, 2002 Cardiac diseases and in particular coronary artery disease are the leading cause of death and morbidity in the industrialized countries The development of reliable cardiac imaging techniques is considered a key issue in improving patient care The introduction of multi slice computed tomography in 1998 represented a breakthrough of CT technology in cardiac imaging For the first time widely available CT systems can be used for non invasive angiographic assessment of the heart and the coronary arteries This book presents and discusses the technical concepts the potential spectrum of applications and the future perspectives of multi slice CT in cardiac imaging based on the experience of internationally leading clinical institutions It shows that this new modality has the potential to become an important and robust tool for non invasive and early diagnosis of cardiac diseases thus complementing invasive and non invasive imaging modalities in clinical routine in the near future

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