

Coronary Computed Tomography Angiography: Overview of Technical Aspects, Current Concepts, and Perspectives

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Abstract

Multidetector-row electrocardiogram (ECG)-gated cardiac computed tomography (CT) will probably be a major noninvasive imaging option in the near future. Recent developments indicate that this new technology is improving rapidly.

This article presents an overview of the current concepts, perspectives, and technical capabilities in coronary CT angiography (CTA). We have reviewed the recent literature on the different applications of this technology; of particular note are the many studies that have demonstrated the high negative predictive value (NPV) of coronary CTA, when performed under optimal conditions, for significant stenoses in native coronary arteries. This new technology's level of performance allows it to be used to evaluate the presence of calcified plaques, coronary bypass graft patency, and the origin and course of congenital coronary anomalies.

Despite a high NPV, the robustness of the technology is limited by arrhythmias, the requirement of low heart rates, and calcium-related artifacts. Some improvements are needed in the imaging of coronary stents, especially the smaller stents, and in the detection and characterization of noncalcified plaques. Further studies are needed to more precisely determine the role of CTA in various symptomatic and asymptomatic patient groups.

Clinical testing of 64-slice scanners has recently begun. As the technology improves, so does the spatial and temporal resolution. To date, this is being achieved through the development of systems with an increased number of detectors and shorter gantry rotation time, as well as the development of systems equipped with 2 X-ray tubes and the eventual development of flat-panel technology. Thus further improvement of image quality is expected.

Abrégé

La tomodescritométrie (TDM) cardiaque à multidétecteurs avec synchronisation électrocardiogramme (ECG) sera probablement bientôt une importante option d'imagerie non invasive. Les développements récents indiquent que cette nouvelle technologie s'améliore rapidement.

Cet article présente un aperçu des concepts, perspectives et capacités techniques actuels de la coronarographie (coro-TDM). Nous avons examiné la documentation récente sur les différentes applications de cette technologie, et nous en particulier les nombreuses études qui ont démontré la valeur prédictive négative (VPN) élevée de la coro-TDM, quand elle est exécutée dans les meilleures conditions, pour des sténoses significatives dans les artères coronariennes natives. Le niveau de rendement de cette nouvelle technologie permet de l'utiliser pour évaluer la présence de plaques calcifiées, la perméabilité des greffes de pontage coronarien, et l'origine et l'évolution des anomalies coronariennes congénitales.

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Received April 3, 2006

Revision requested July 10, 2006

Resubmitted September 13, 2006

Accepted October 10, 2006

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Radiologists

Can J Assoc Radiol 2007;58(2):92–108

Key Words: cardiac computed
tomography; coronary
computed tomography
angiography; catheter coronary

Technical Aspects Of Tomography

Olle Pahlm, Galen Wagner



Technical Aspects Of Tomography:

Imaging of the Sternocostoclavicular Region Anne Grethe Jurik,2007-02-24 This book offers a review of the normal histopathological anatomy imaging techniques and diagnostic findings for a broad spectrum of clinical problems It includes a classification of inflammatory syndromes previously described under several different terms It is the first textbook to describe the imaging of all anterior chest wall disorders Physical and Technical Aspects of Nuclear Cardiology Elias H. Botvinick,Ernest V. Garcia,1997 Abdominal Imaging E-Book Dushyant V Sahani,Anthony E Samir,2016-06-25 Richly illustrated and comprehensive in scope Abdominal Imaging 2nd Edition by Drs Dushyant V Sahani and Anthony E Samir is your up to date one volume source for evaluating the full range of diagnostic therapeutic and interventional challenges in this fast changing field Part of the Expert Radiology series this highly regarded reference covers all modalities and organ systems in a concise newly streamlined format for quicker access to common and uncommon findings Detailed expert guidance accompanied by thousands of high quality digital images helps you make the most of new technologies and advances in abdominal imaging Offers thorough coverage of all diagnostic modalities for abdominal imaging radiographs fluoroscopy ultrasound CT MRI PET and PET CT Helps you select the best imaging approaches and effectively interpret your findings with a highly templated well organized at a glance organization Covers multi modality imaging of the esophagus stomach small bowel colon liver pancreas gall bladder bile ducts spleen pelvic lymph nodes kidneys urinary tract prostate and peritoneum Includes new chapters on esophageal imaging 5RECIST WHO and other response criteria and a new section on oncologic imaging Keeps you up to date with the latest developments in image guided therapies dual energy CT elastography and much more Features more than 2 400 high quality images including 240 images new to this edition Non-Destructive Testing of Fibre-Reinforced Plastics Composites J. Summerscales,1990-09-30 **Cancer Imaging** M. A. Hayat,2007-11-21 This second of two volumes on Cancer Imaging covers the three major topics of imaging instrumentation general imaging applications and imaging of a number of human cancer types Where the first volume emphasized lung and breast carcinomas Volume 2 focuses on prostate colorectal ovarian gastrointestinal and bone cancers Although cancer therapy is not the main subject of this series the crucial role of imaging in selecting the type of therapy and its post treatment assessment are discussed The major emphasis in this volume is on cancer imaging however differentiation between benign tumors and malignant tumors is also discussed This volume is sold individually and Cancer Imaging Volume 1 ISBN 978 0 12 370468 9 sells separately for 189 and also as part of a two volume set ISBN 978 0 12 374212 4 for 299 Concentrates on the application of imaging technology to the diagnosis and prognosis of prostate colorectal ovarian gastrointestinal and bone cancers Addresses relationship between radiation dose and image quality Discusses the role of molecular imaging in identifying changes for the emergence and progression of cancer at the cellular and or molecular levels **Lung Cancer: New Insights for the Healthcare Professional: 2013 Edition** ,2013-07-22 Lung Cancer New Insights for the Healthcare

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