

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 tomodesuétométrie (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 noté 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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Technical Aspects Of Tomography

**Jeannean Hall Rollins, Bruce W.
Long, Tammy Curtis**



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Imaging of Diseases of the Chest E-Book David M. Hansell, David A. Lynch, H. Page

McAdams, Alexander A. Bankier, 2009-12-11 This is the ideal resource for all those requiring an authoritative and up to date review of imaging appearances of diseases of the lung pleura and mediastinum Chest radiography and CT are integrated with other imaging techniques including MRI and PET where appropriate The clinical and pathologic features of different diseases are provided in varying degrees of detail with more in depth coverage given to rarer and less well understood conditions A single volume comprehensive reference text on chest radiology Provides in a single resource all of the information a generalist in diagnostic radiology needs to know Concisely and clearly written by a team of 4 internationally recognized authors Avoids the inconsistency repetition and unevenness of coverage that is inherent in multi contributed books Multimodality coverage integrated throughout every chapter All of the applicable imaging modalities are covered in a clinically relevant diagnostically helpful way Approximately 3 000 high quality good sized images Provides a complete visual guide that the practitioner can refer to for help in interpretation and diagnosis Covers both common and uncommon disorders Provides the user with a single comprehensive resource no need to consult alternative resources Access the full text online and download images via Expert Consult Access the latest version of the Fleischner Society's glossary of terms for thoracic imaging Outlines summary boxes key points used throughout Makes content more accessible by highlighting essential information Brand new color images to illustrate Functional imaging techniques Many of the new imaging techniques can provide functional as well as anatomic information Introduction of a second color throughout in summary boxes in order to better highlight key information There is a wealth of key information in the summary boxes will be highlighted more from the narrative text and will therefore be easier to access Practical tips on identifying anatomic variants and artefacts in order to avoid diagnostic pitfalls Many misdiagnoses are the result of basic errors in correlating the anatomic changes seen with imaging to their underlying pathologic processes Latest techniques in CT MRI and PET as they relate to thoracic diseases The pace of development in imaging modalities and new applications refined techniques in existing modalities continues to drive radiology forward as a specialty Emphasis on cost effective image modality selection Addresses the hugely important issue of cost containment by emphasizing which imaging modality is helpful and which is not in any given clinical diagnosis COPD and Diffuse Lung Disease Small Airway disease chapters extensively up dated Access

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