



Universiteit
Leiden
The Netherlands

Computed tomography coronary angiography : from quantification of coronary atherosclerosis to risk stratification of patients

Graaf, M.A. de

Citation

Graaf, M. A. de. (2016, November 8). *Computed tomography coronary angiography : from quantification of coronary atherosclerosis to risk stratification of patients*. Retrieved from <https://hdl.handle.net/1887/43967>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/43967>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/43967> holds various files of this Leiden University dissertation

Author: Graaf, Michiel A. de

Title: Computed tomography coronary angiography : from quantification of coronary atherosclerosis to risk stratification of patients

Issue Date: 2016-11-08

**Computed tomography coronary angiography:
From quantification of coronary atherosclerosis
to risk stratification of patients**

The research described in this thesis was performed at the Department of Cardiology of the Leiden University Medical Center, Leiden, The Netherlands

Lay-out: Optima Grafische Communicatie

Printed by: Optima Grafische Communicatie

ISBN: 978-94-6169-939-8

Financial support for the costs associated with the publication of this thesis was gratefully received from: Amgen, Bayer, Biotronik, Medis medical imaging systems, Pfizer, Sanofi, Servier

Financial support by the Dutch Heart Foundation for the publication of this thesis is gratefully acknowledged.

Computed tomography coronary angiography: From quantification of coronary atherosclerosis to risk stratification of patients

Proefschrift

Ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van Rector Magnificus prof.mr. C.J.J.M. Stolker,
volgens besluit van het College van Promoties
te verdedigen op

dinsdag 8 november 2016 klokke 13.45 uur

Door

Michiel Alexander de Graaf
Geboren te Woerden in 1988

Promotores

Prof. dr. Jeroen J. Bax

Prof. dr. J. Wouter Jukema

Co-promotor

Dr. Arthur J. Scholte

Promotiecommissie

- Prof. dr. ir. B.P.F. Lelieveldt
- Prof. dr. ir. J.H.C. Reiber
- Prof. dr. M.J. Schalij
- Prof. dr. W. J. Niessen (Erasmus MC)
- Prof. dr. J. Knuuti (Turku, PET Centre, Finland)
- Prof. dr. L-F. de Geus-Oei

Thesis outline

Chapter 1	General introduction and outline	9
Chapter 2	Computed tomography angiography and other applications of CT	17
Part 1	Quantitative assessment of coronary atherosclerosis on coronary CTA	55
Chapter 3	High coronary plaque load: a heavy burden.	57
Chapter 4	Automatic quantification and characterization of coronary atherosclerosis with computed tomography coronary angiography: cross-correlation with intravascular ultrasound virtual histology.	65
Chapter 5	Enhanced characterization of calcified areas in intravascular ultrasound virtual histology images by quantification of the acoustic shadow: validation against computed tomography coronary angiography.	89
Chapter 6	Automatic detection and quantification of the Agatston coronary artery calcium score on contrast computed tomography angiography.	107
Chapter 7	Automated quantitative coronary computed tomography correlates of myocardial ischaemia on gated myocardial perfusion SPECT.	127
Chapter 8	Feasibility of an automated quantitative computed tomography angiography-derived risk score for risk stratification of patients with suspected coronary artery disease.	147
Chapter 9	Feasibility of automated quantitative assessment of serial computed tomography angiography to detect changes in coronary atherosclerosis.	167
Part 2	Clinical aspects coronary CTA in high risk diabetic patients without chest pain syndrome	185
Chapter 10	Changes in ischaemia as assessed with single-photon emission computed tomography myocardial perfusion imaging in high-risk patients with diabetes without cardiac symptoms: relation with coronary atherosclerosis on computed tomography coronary angiography.	187

Chapter 11 Prognostic value of coronary computed tomography angiography in high risk diabetic patients without chest pain syndrome.	205
Chapter 12 Summary and conclusions	229
Chapter 13 Samenvatting en conclusies	237
List of publications	245
Dankwoord	251
Curriculum Vitae	253

