The role of cardiovascular magnetic resonance imaging and computed tomography angiography in suspected non–ST-elevation myocardial infarction patients: Design and rationale of the CARdiovascular Magnetic rEsoNance imaging and computed Tomography Angiography (CARMENTA) trial

Martijn W. Smulders, MD, [a,b,j] Bastiaan L. J. H. Kietselaer, MD, PhD, [a,b,c,j] Marco Das, MD, PhD, [b,c] Joachim E. Wildberger, MD, PhD, [b,c] Harry J. G. M. Crijns, MD, PhD, [a,b] Leo F. Veenstra, MD, [a] Hans-Peter Brunner-La Rocca, MD, PhD, [a,b] Marja P. van Dieijen-Visser, PhD, [d] Alma M. A. Mingels, PhD, [d] Pieter C. Dagnelie, PhD, [e,f] Mark J. Post, MD, PhD, [b,g] Anton P. M. Gorgels, MD, PhD, [a,b] Antoinette D. I. van Asselt, PhD, [h] Gaston Vogel, [h] Simon Schalla, MD, [a,b] Raymond J. Kim, MD, [i] and Sebastiaan C. A. M. Bekkers, MD, PhD [a,b] Maastricht, The Netherlands; and Durham, NC

Background Although high-sensitivity cardiac troponin (hs-cTn) substantially improves the early detection of myocardial injury, it lacks specificity for acute myocardial infarction (MI). In suspected non–ST-elevation MI, invasive coronary angiography (ICA) remains necessary to distinguish between acute MI and noncoronary myocardial disease (eg, myocarditis), unnecessarily subjecting the latter to ICA and associated complications. This trial investigates whether implementing cardiovascular magnetic resonance (CMR) or computed tomography angiography (CTA) early in the diagnostic process may help to differentiate between coronary and noncoronary myocardial disease, thereby preventing unnecessary ICA.

Study Design In this prospective, single-center, randomized controlled clinical trial, 321 consecutive patients with acute chest pain, elevated hs-cTnT, and nondiagnostic electrocardiogram are randomized to 1 of 3 strategies: (1) CMR, or (2) CTA early in the diagnostic process, or (3) routine clinical management. In the 2 investigational arms of the study, results of CMR or CTA will guide further clinical management. It is expected that noncoronary myocardial disease is detected more frequently after early noninvasive imaging as compared with routine clinical management, and unnecessary ICA will be prevented. The primary end point is the total number of patients undergoing ICA during initial admission. Secondary end points are 30-day and 1-year clinical outcome (major adverse cardiac events and major procedure-related complications), time to final diagnosis, quality of life, and cost-effectiveness.

Conclusion The CARMENTA trial investigates whether implementing CTA or CMR early in the diagnostic process in suspected non–ST-elevation MI based on elevated hs-cTnT can prevent unnecessary ICA as compared with routine clinical management, with no detrimental effect on clinical outcome.