Press release

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Basic information

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Department of: Clinical Medicine

Main supervisor: Won Yong Kim

Title of dissertation: Cardiovascular Magnetic Resonance Imaging for Coronary Atherosclerotic Plaque Visualization and Transcatheter Aortic Valve Performance Assessment

Date for defence: January 12th, 2026 at (time of day): 02.00 PM Place: Auditorium G206-145, Aarhus University Hospital, Palle Juul-Jensens Boulevard 99, Aarhus N

Press release (Danish)

Magnetisk resonans skanning af hjertet kan visualisere åreforkalkningssygdom samt vurdere funktionen af hjerteklapproteser

Et ph.d.-projekt fra Aarhus Universitet, Health undersøger, hvordan avanceret magnetisk resonans (MR) skanning af hjertet kan anvendes til vurdering af åreforkalkningssygdom og hjerteklapfunktion efter kateterbaseret aortaklapsubstitution.

Med en MR-skanning kan hjertets anatomi, funktion og vævsammensætning vurderes uden at påføre individet ioniserende stråling. Tekniske fremskridt indenfor skanningsudførelse og billedrekonstruktion har udvidet metoden til også at omfatte billeddannelse af hjertets kransårer samt kvantificering af blodflow og hjerteklapfunktion.

Åreforkalkningssygdom i hjertet er en hyppig tilstand, som er forbundet med stor mortalitet. I projektet blev patienter med åreforkalkningssygdom undersøgt ved hjælp af en ny MR-baseret teknik, der kan identificere og visualisere åreforkalkningsplaks i hjertets kransårer uden brug af stråling eller kontraststoffer. Sammenlignet med hjerte CT-skanning ses kun delvist overlap i den målte plakbyrde, hvilket indikerer at de to billedmodaliteter belyser forskellige biologiske aspekter af åreforkalkningssygdom i hjertet.

Patienter med forsnævring af aortaklappen kan behandles med transkateter aortaklapsubstitution (TAVI). Ph.d.-projektet undersøgte den hæmodynamiske funktion af to forskellige proteseklapper, herunder åbningsareal og klaputæthed, ved hjælp af fase-kontrast hjerte-MR i et randomiseret klinisk forsøg. Resultaterne dokumenterer generelt god funktion af moderne klapproteser og fremhæver værdien af hjerte-MR som et supplement til ekkokardiografi ved vurdering af klapfunktion efter TAVI.

Projektet er gennemført af Alexandra Amalie Uglebjerg Pedersen, der forsvarer det den 12. januar 2026.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 12. januar 2026 kl. 14.00 på Aarhus Universitetshospital i Auditorium G206-145, Indgang G, Palle Juul-Jensen Boulevard 99, 8200 Aarhus N.
Titlen på projektet er "Cardiovascular Magnetic Resonance Imaging for Coronary Atherosclerotic Plaque Visualization and Transcatheter Aortic Valve Performance Assessment".
Yderligere oplysninger: Ph.d.-studerende Alexandra Amalie Uglebjerg Pedersen, e-mail: aup@clin.au.dk, tlf. +45 30704436.

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Press release (English)

Cardiovascular magnetic resonance can visualize coronary artery disease and assess aortic valve prosthesis performance

A PhD project from Aarhus University, Health investigates the use of advanced cardiovascular magnetic resonance (CMR) imaging for the assessment of coronary atherosclerosis and prosthetic heart valve function.

CMR enables enables detailed evaluation of cardiac anatomy, function, and tissue characteristics without exposing patients to ionizing radiation. Recent technological advances in image acquisition and reconstruction techniques have expanded its utility to include coronary artery imaging as well as quantitative assessment of blood flow and heart valve function.

In this project, patients with coronary artery disease were examined using a novel CMR technique that allows for characterization of coronary plaques without the use of ionizing radiation or contrast agents. When compared with cardiac computed tomography (CT), only partial overlap in measured plaque burden was observed, indicating that the two modalities capture different biological components of atherosclerotic disease.

Furthermore, CMR was used to assess prosthetic heart valve performance in patients undergoing transcatheter aortic valve implantation (TAVI). In a randomized clinical trial, two transcatheter valve systems were compared. Using phase-contrast CMR, valve opening area and regurgitation were quantified and compared between devices. The findings demonstrate good overall performance of contemporary aortic valve prostheses with low rates of paravalvular regurgitation for both prostheses. The results highlight the value of CMR for detailed, quantitative evaluation of prosthetic valve function as a complement to echocardiography.

The project was carried out by Alexandra Amalie Uglebjerg Pedersen, who is defending her dissertation on January 12th, 2026.

The defence is public and takes place on January 12th, 2026 at 02.00 PM at Aarhus University Hospital, Palle Juul-Jensens Boulevard 99, 8200 Aarhus N in Auditorium G206-145, Entrance G.
The title of the project is "Cardiovascular Magnetic Resonance Imaging for Coronary Atherosclerotic Plaque Visualization and Transcatheter Aortic Valve Performance Assessment"

For more information, please contact PhD student Alexandra Amalie Uglebjerg Pedersen, email: aup@clin.au.dk, Phone +45 30704436.

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