AI-AIF: artificial intelligence-based arterial input function correction for quantitative stress perfusion cardiac magnetic resonance

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Declaration of Financial Interests or Relationships

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I have no financial interests or relationships to disclose with regard to the subject matter of this presentation.
Myocardial perfusion quantification

Arterial Input Function

Myocardial Tissue Curve
The problem: signal saturation

Ichihara T et al. MRM 2009
Current solutions

- **Dual-bolus**

- **Dual-sequence**

![Diagram of Dual-bolus and Dual-sequence methods]

Saturation prepulse
Prepulse delay
Image readout

One RR interval acquisition

Low-resolution short saturation time AIF images

Standard three slice high-resolution perfusion images
Proposed solution

\[ v_p \frac{dC_p}{dt} = F_p \quad \cdots \]

\[ v_e \frac{dC_e}{dt} = PS \quad \cdots \]

Quantification

Stress MBF
Model training

• Trained on data from 201 patients

• Independent test on 28 consecutive patients + 16 external patients
Results

- Comparison of AI-AIF and dual-sequence curves

![Graph a)](image1.png) NMSE = 1.9%

![Graph b)](image2.png) NMSE = 0.3%

![Graph c)](image3.png) NMSE = 6.5%
Results

• Comparison of curve features
Results

• Comparison of MBF maps
Results

• Comparison of MBF values
Thank you

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