

Visualising the invisible

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Propositions accompanying the PhD thesis:

VISUALISING THE INVISIBLE

Dark-blood late gadolinium enhancement MRI
for improved detection of subendocardial scar

Robert Johannes Holtackers

Maastricht, 13 May 2022

1. Dark-blood LGE without additional magnetization preparation provides superior visualisation and quantification of ischemic scar compared to the current in-vivo reference standard. (*this thesis*)
2. The use of a steadily increasing dynamic inversion time improves blood pool suppression and consistency in high-resolution 3D dark-blood LGE. (*this thesis*)
3. Dark-blood LGE is a promising new tool for the assessment of papillary muscle fibrosis and the myocardial ischemic burden. (*this thesis*)
4. For a mainstream adoption of dark-blood LGE methods, clinical availability and ease-of-use are crucial. (*this thesis*)
5. Superior detection and assessment of myocardial scar may reclassify patients and either save them from treatment that lacks effectiveness or offer them treatment which was not deemed to be effective before. (*impact*)
6. A medical engineer must always consider the clinical applicability of his research.
7. Both the insecurity of the physician, as well as the technical developments in medical imaging, result in an overdose of images for the radiologist.
8. Imaging tests alone do not change patient outcomes, but it's how we act on them that might change them.
– *Ron Blankstein* (cardiologist)
9. Scientists investigate that which already is.
Engineers create that which has never been.
– *Albert Einstein* (physicist, 1879-1955)
10. One good test is worth a thousand expert opinions.
– *Wernher von Braun* (rocket engineer, 1912-1977)

Stellingen behorende bij het proefschrift:

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Robert Johannes Holtackers

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1. Donkerbloed LGE zonder extra magnetisatie voorbereiding biedt superieure visualisatie en kwantificering van ischemisch litteken vergeleken met de huidige *in-vivo* referentiestandaard. (*dit proefschrift*)
2. Het gebruik van een gestaag toenemende dynamische inversie tijd verbetert de onderdrukking en consistentie van bloed in hoge resolutie 3D donkerbloed LGE. (*dit proefschrift*)
3. Donkerbloed LGE is een veelbelovende methode voor de beoordeling van papillair spier fibrose en myocardiale ischemische belasting. (*dit proefschrift*)
4. Voor een mainstream adoptie van donkerbloed LGE methoden zijn de klinische beschikbaarheid en het gebruiksgemak cruciaal. (*dit proefschrift*)
5. De superieure detectie en beoordeling van myocardiaal littekenweefsel kan patiënten herclassificeren en hen ofwel behoeden voor een behandeling die niet effectief is, ofwel hen een behandeling aanbieden die voorheen niet effectief werd geacht. (*impact*)
6. Een medisch ingenieur dient altijd de klinische toepasbaarheid van zijn onderzoek af te wegen.
7. Zowel de onzekerheid van de arts als de technische ontwikkelingen in de beeldvorming leiden tot een overdosis aan beelden voor de radioloog.
8. Beeldvorming alleen verandert de patiëntresultaten niet, maar het is de manier waarop we ernaar handelen die ze zou kunnen veranderen.
– *Ron Blankstein* (cardioloog)
9. Wetenschappers onderzoeken wat er al is.
Ingenieurs creëren dat wat er nooit is geweest.
– *Albert Einstein* (fysicus, 1879-1955)
10. Eén goede test is meer waard dan duizend meningen van experts.
– *Wernher von Braun* (raket ingenieur, 1912-1977)