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Letter to the Editor

# Authors' response to 'Cardiovascular magnetic resonance: a promising method for detecting myocardial scar in patients with cardiac implantable devices'

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We thank Dr. Ye and colleagues for their interest in our study [1], and for highlighting the importance of optimising late gadolinium enhancement (LGE) sequences for myocardial scar detection in patients with cardiac implantable electronic devices (CIEDs) to minimise image artefact. We demonstrate high rates (69%) of scar in this population, and the distribution and extent of scar clearly guided clinical decision making. This requirement for specific metal artefact reduction strategies for device patients has been recognised by scanner manufacturers who are starting to offer dedicated wideband LGE sequences.

We accept there is further work to do and that phenotyping of scar requires greater granularity - machine-learning algorithms that enable automated analysis and co-registration with other imaging/ physiological measurement systems are being validated to facilitate this [2]. These however will require adaptation for analysis of images acquired using optimised LGE sequences, to validate the thresholding parameters used and exclude residual artefact. Further to this, the other parametric mapping techniques (T1, T2, T2*) require optimisation for use in patients with CIEDs, where the generator may induce measurement errors, even outside areas with artefact visually.

We would however disagree with Dr. Ye who proposes the requirement for a large multi-centre study to further demonstrate the clinical value of this technical development. We found significant artefact in 88% of patients with implantable cardioverter-defibrillators using standard LGE sequences, and other groups have reported similar challenges [3]. A prospective multicentre study to replicate these findings would prove costly and is unlikely to yield significant new insights.

## References

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