

ORAL PRESENTATION

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Comparison of gadolinium dose and acquisition time for late gadolinium enhancement at 3.0 T

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Background

Although late gadolinium enhancement (LGE) is a widely used technique in daily clinical practice, the optimal contrast dose and time of acquisition at 3.0 T is unknown. Aim of our study was to compare different contrast doses and acquisition times for LGE imaging at 3.0 T.

Methods

34 patients with chronic myocardial infarction were randomized to 0.1 (n = 12), 0.15 (n = 11) and 0.2 (n = 11) mmol/

Kg of gadolinium contrast (gadobenate dimeglumine - MultiHance[®]). T1-weighted inversion recovery gradient echo sequences were performed at 5, 10, 15 and 20 minutes post-administration of contrast in all groups, with an individually adapted trigger delay at every single time point. Signal-to-noise ratio (SNR) of the scar, contrast-to-noise ratio (CNR) of the scar in comparison to healthy myocardium and the percentage of enhanced area volume relative to the global myocardium were quantified. A 4-point score was used to assess image quality in all studies.

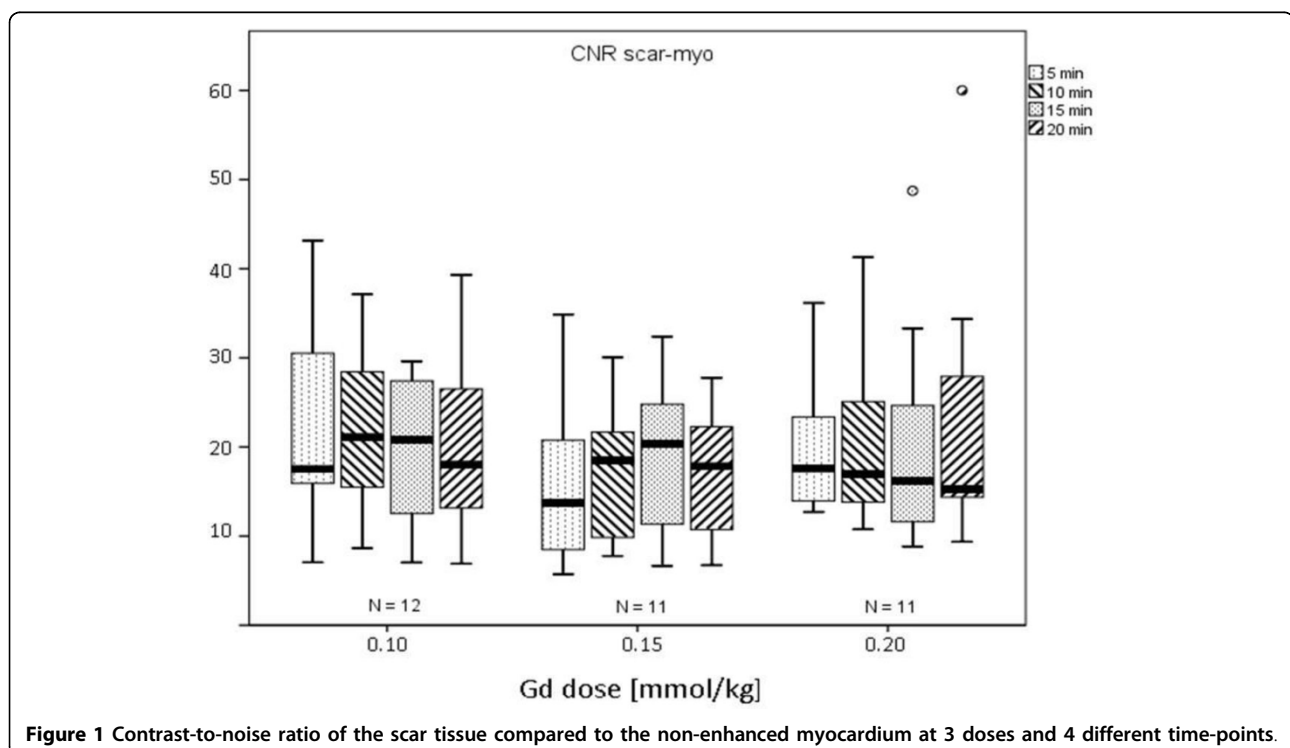


Figure 1 Contrast-to-noise ratio of the scar tissue compared to the non-enhanced myocardium at 3 doses and 4 different time-points.

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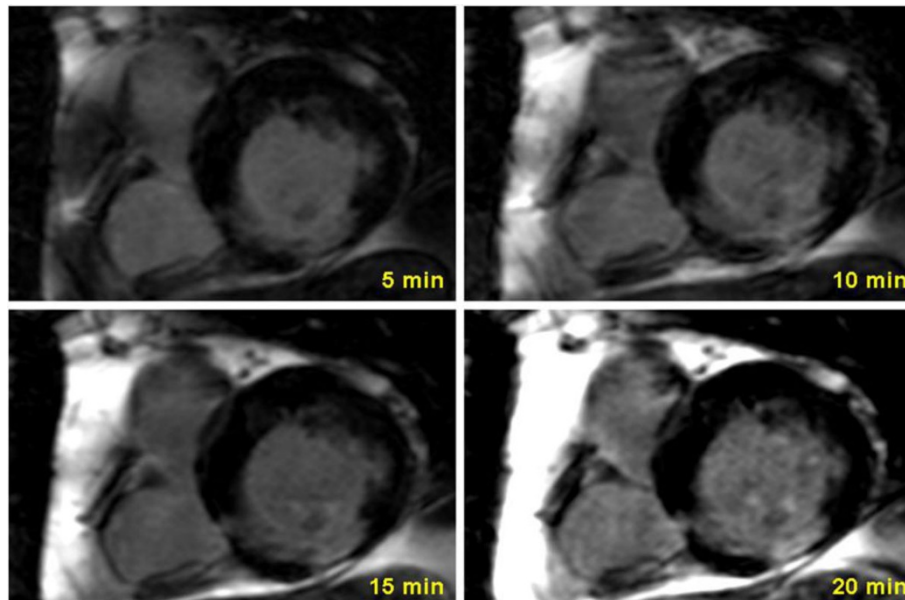


Figure 2 Short axis views of a patient with an infarction of the basal inferior wall acquired 5, 10, 15 and 20 min after the administration of 0.10 mmol/kg Gd.

Results

No differences were observed in SNR and CNR (see Figure 1), neither between the doses being evaluated nor between the different acquisition times. Regarding enhanced area volume, at 0.1 mmol/kg of Gd contrast, imaging at 5 min yielded lower enhanced area volumes in comparison to 15 and 20 minutes (7.5 ± 4.3 vs 9 ± 3.9 vs 9.5 ± 5.4 , $p = 0.03$ and $p = 0.02$, respectively) (Figure 2). No significant differences between imaging times were observed at 0.15 and 0.2 mmol/kg. Finally, when analyzing image quality at 0.20 mmol/kg Gd significant changes were observed between 5 and 15 min (2.6 ± 0.5 vs 3.2 ± 0.8 , $p = 0.014$), 5 and 20 min (2.6 ± 0.5 vs 3.2 ± 0.8 , $p = 0.046$) as well as 10 and 15 min (2.7 ± 0.5 vs 3.2 ± 0.8 , $p = 0.025$), with no significant differences in the remaining imaging times and doses.

Conclusions

In LGE imaging at 3.0T low doses of gadolinium and early acquisitions perform equally well in terms of SNR and CNR, although a trend towards poorer image quality with early acquisitions is noted. When using lower contrast doses, early acquisition is associated with lower enhanced area volumes. As a consequence, late acquisition is preferable. Studies with sufficient diagnostic quality could be obtained using shorter protocols with low contrast doses.

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