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Comparaison of semi-automated quantification methods of LGE with CMR in patients with hypertrophic cardiomyopathies

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Purpose: Hypertrophic cardiomyopathy (HCM) is one of the first cause of sudden cardiac death (SCD) in young patients. The presence of late gadolinium enhancement (LGE) in cardiac magnetic resonance (CMR) imaging is a marker of myocardial fibrosis. Extent of LGE has been shown to be associated with the risk of SCD among other markers. There is no consensus regarding the method of quantification of LGE. The purpose of this study was to identify the most reliable and reproducible semi-automatic method of LGE quantification to predict SCD risk.

Materials and methods: 103 patients from the center of hereditary cardiac diseases were prospectively included. 53 patients with LGE underwent different semi-automated quantification methods for LGE evaluation: nSD-Standard Deviation (from 2 to 6SD) and FWHM (full width at half maximum) with a direct comparison with reference method using manual tracing. Inter- and intra-Observer reproducibility have been assessed.

Results: FWHM and 5SD methods were the closest to the manual technique for LGE quantification (respectively 10,8±7,5% and 9,3±7,4% versus 10,3±8,1% for manual tracing, p<0,01). 2SD, 3SD and 4SD overestimated the results, whereas 6SD technique underestimated the results compared to the manual method. Intra and inter- reproducibility were fine with a better results using FWHM method.

Conclusion: 5SD and especially FWHM methods were the most reliable and reproducible semi-automatic techniques for LGE quantification in patients with HCM using CMR.