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| **Title:** Evaluation of synthetic haematocrit models in a local clinical cohort |
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| **Background:** Venepuncturehaematocrit values (Hct) are used with CMR T1 mapping sequences to derive extracellular volume (ECV) as a surrogate of fibrosis. Gold-standard calculation of ECV requires venous Hct sampled within 24 hours of CMR, which can limit applicability. Regression models using native T1 times from the blood pool have been derived to determine synthetic Hct, allowing for ECV calculation in cases without blood sampling. We assessed the accuracy of three published models for synthetic Hct (Treibel (2016), Shang (2018), and Reiter and Puseljic (2024)) in a local dataset. **Method:** Native and post-contrast T1 mapping (MOLLI) was performed (Siemens 3T Vida fit) with same-day blood-sampled Hct. Myocardial and blood pool T1 times were measured in basal and mid-ventricular slices. Bland-Altman analyses were used to compare synthetic Hct against blood-sampled Hct, as well as resultant ECV values.**Results:** 37 patients (9 controls, 7 left ventricular hypertrophy, 7 dilated cardiomyopathy, 7 hypertrophic cardiomyopathy, 6 ischaemic heart disease, 1 cardiac amyloidosis) were studied. The biases between synthetic and blood-sampled Hct were: Treibel -8.15% (LoA: -13.96%, -2.34%); Shang -1.96% (LoA: -8.11%, 4.19%), and Reiter and Puseljic -1.19% (LoA: -7.32%, 4.95%). Comparing synthetic and measured ECV, the biases were: Treibel 5.51% (LoA: 1.34%, 9.67%); Shang 1.34% (LoA: -2.56%, 5.25%), and Reiter and Puseljic -0.86% (LoA: -4.84%, 3.12%).**Conclusion:** Application of published equations for synthetic Hct can exhibit variable bias when compared to blood-sampled Hct. As T1 times vary by field strength, scanner-specific equations may provide more accurate predictions of Hct, and hence ECV. |