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Iron overload in polytransfused patients is associated with subtle alterations of left ventricular systolic function

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Introduction

Recent studies have demonstrated the ability of T2* MR to measure cardiac iron concentrations in patients with multiple blood transfusions.

Purpose

We sought to evaluate whether cardiac iron overload is related to subclinical alterations of systolic left ventricular (LV) dysfunction in such patients

Methods

Seventeen patients (8 M, 9 F, 25 ± 9 years) who underwent multiple transfusions for a chronic hematopathy (12 thalassemia major, 4 aplastic anemias, 1 sickle cell anemia), but who did not have any overt cardiac disease, and 2 normal volunteers underwent MR assessment of T2* times using a multi-echo gradient echo sequence to estimate iron content in the liver and heart. These parameters were correlated to LV volumes and ejection fraction measured using SSFP and regional circumferential shortening strain, and apical rotation and twist measured using tagged images with HARP analysis.

Results

Mean LV ejection fraction was 59 ± 8% [range 47-70%], mean cardiac and hepatic T2* were 24 ± 13 [8-41] and 6 ± 6 [1-28] ms. LV ejection fraction ($r = 0.45$, $p < 0.001$), eulerian circumferential shortening strain ($r = 0.45$, $p < 0.001$) and apical rotation ($r = 0.69$, $p < 0.001$) and twist ($r = 0.60$, $p < 0.001$) were significantly correlated to cardiac T2* times. No significant correlation was observed between these parameters and hepatic T2* ($r = -0.29$, 0.02, -0.23, 0.00 respectively, all p = NS) or plasma ferritin levels ($r = 0.19$, 0.25, 0.11, 0.09 respectively, all p = NS).

Conclusion

Cardiac but not liver iron overload is correlated with subtle but significant alterations of systolic cardiac function in patients without clinical heart disease. This emphasizes the importance of adequate iron chelation for maintained cardiac function in such patients with multiple blood transfusions.