

Meeting abstract

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1049 Integrated cardiac and vascular assessment in takayasu's arteritis and systemic lupus erythematosus by cardiovascular magnetic resonance

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Background

Takayasu's arteritis (TA) is a disease of vascular inflammation, and systemic lupus erythematosus (SLE) is a multi-system inflammatory disorder in which vasculitis is common, and accelerated atherosclerosis is typical. Cardiovascular magnetic resonance (CMR) can be used to perform an integrated assessment of vascular and cardiac disease. The purpose of this study was to investigate the utility of CMR in TA and SLE.

Methods

16 patients with TA, 11 patients with SLE and two populations comprising 110 normal volunteers were prospectively recruited. All subjects with TA and SLE underwent a three stage CMR protocol: 1. carotid artery study, 2. endothelial function, 3. cardiac study. Multiple slices were acquired perpendicular to the carotid artery, and measures of vessel wall morphology including the wall/outer wall

(W/OW) ratio (a measure of vascular thickening) were derived. Endothelial function was measure by brachial artery reactivity after five minutes of distal ischemia. The cardiac study included assessment of left ventricular volumes, mass, systolic function, and imaging in the late phase after gadolinium-DTPA for myocardial fibrosis and infarction. All subjects provided written informed consent and the study was approved by the institutional review board.

Results

Vessel wall volume and W/OW ratio were highest in TA and higher in SLE compared with normals. The differences between all groups were statistically significant. Z scores (a measure of variation) were derived. (Table 1 and Figure 1).

Table 1: Carotid Artery Wall Volume and W/OW Ratio in TA and SLE compared with normal subjects.

	TA	SLE	Normals	p (TA v SLE v Normals)
Wall Volume Left/mm ³	1030	774	625	<0.05
Wall Volume Right/mm ³	1059	748	655	<0.05
W/OW Right(%)	45	36	32	<0.05
W/OW Left (%)	51	35	31	<0.05

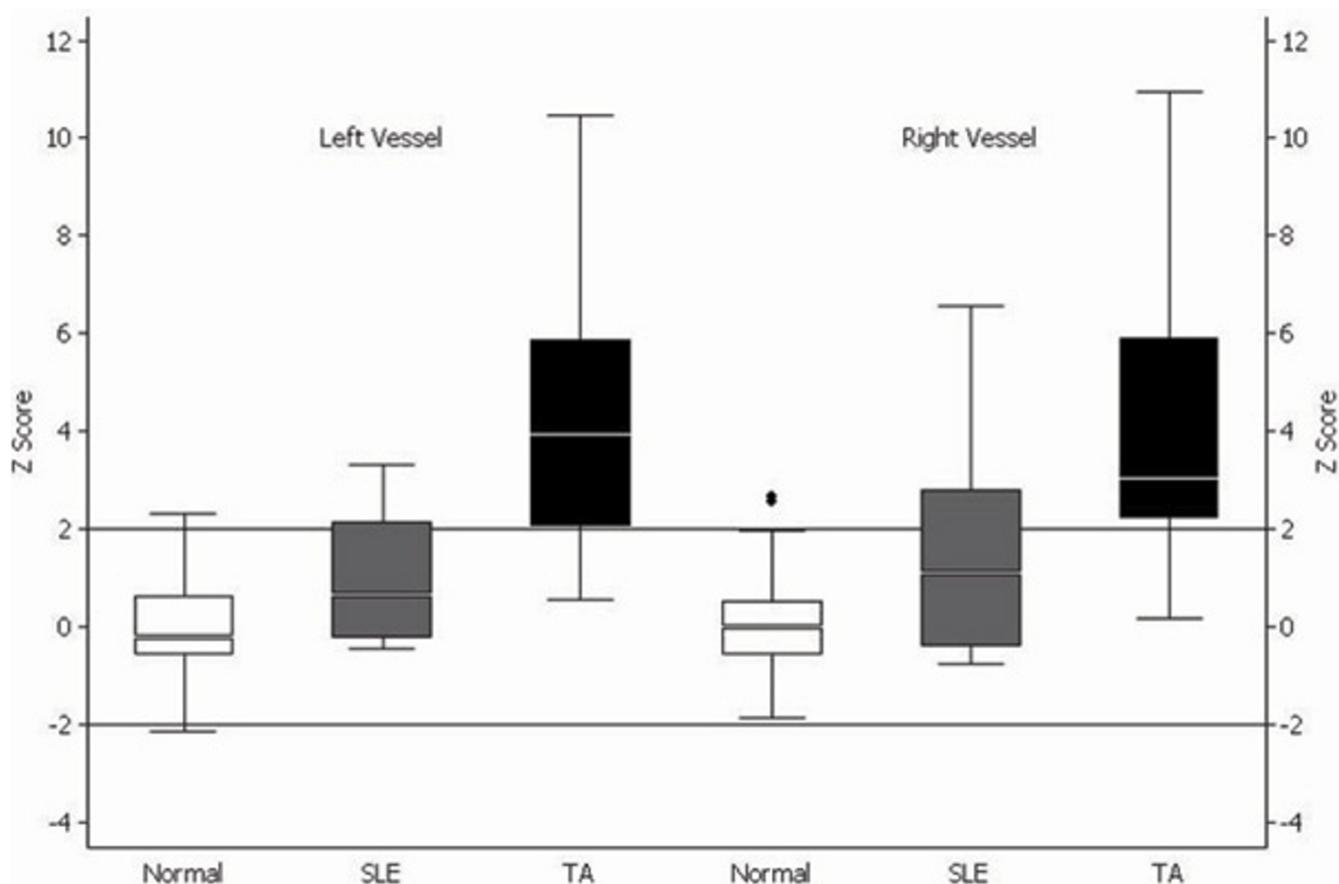


Figure 1

Box plot of Z scores for vessel wall volume for TA, SLE and normal subjects, left and right carotid arteries. The Z score is significantly greater for TA than SLE, and for TA and SLE compared with normal subjects.

Endothelial function was severely impaired in TA and SLE. Mean flow-mediated dilatation was 6.3% for patients with TA (CI 2.4% to 10.2%), and 4.0% for the SLE patients (CI -3.4% to 11.4%), significantly below published normal value using an identical technique (15.5% (CI 11.6 to 19.4))¹(SLE $p = 0.011$, TA $p = 0.004$).

BSA-indexed LV volumes were lower at end systole in both TA and SLE (TA: 19 ± 4 ml/m² $p < 0.001$, SLE: 20 ± 4 ml/m², Normals 25 ml/m² $p < 0.05$), and this was reflected in more dynamic left ventricular function in TA (ejection fraction (EF) = $74 \pm 3\%$ vs Normals $67 \pm 1\%$ $p < 0.001$), and a trend to higher EF in SLE ($71 \pm 5\%$ $p = 0.09$).

Late gadolinium enhancement (LGE) was seen in 5 of 15 TA patients (33%), and in 6 of 10 SLE patients (60%). The pattern of LGE included midwall fibrosis, subendocardial infarction, and insertion point fibrosis in both patient groups.

Conclusion

CMR identifies significant vessel wall thickening and endothelial dysfunction in TA and SLE compared with normal controls. The W/OV ratio is helpful as a measure of vessel wall thickening. Reduced end-systolic volumes indicate more dynamic systolic function, which may occur as a response to reduced vascular compliance. There is a high prevalence of late gadolinium enhancement of all patterns in these patients which warrants further study. Overall, an integrated method of cardiovascular assessment by CMR has a high diagnostic yield in TA and SLE.

References

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