

Evaluation of patients with suspected cardioembolic stroke using Cardiovascular MRI - A comparative study with echocardiography

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Introduction: The aim of our study was to compare Cardiovascular MRI (CVMR) and Echocardiography (TTE and TEE) used in the detection of intracardiac thrombi in patients with suspected cardioembolic stroke (CES). Over the years, cardiac imaging with different types of sequences has emerged as a non invasive alternative for the detection and characterisation of intracardiac masses.[1,2,3] This study examined the utility of CVMR for the detection of non-thrombotic additional findings. We will demonstrate the diagnostic impact of CVMR.

Methods: Over a 12 month period between September 2005 and September 2006, 106 consecutive patients with a suspected CES had CVMR for the detection of intracardiac thrombi. All CVMR examinations were performed on a 1.5T MR scanner using CINE trueFISP, contrast enhanced MR angiography, delayed enhanced inversion recovery trueFISP and first pass imaging. The clinical information and study reports of echocardiography, CVMR, MR Brain and Carotids was retrospectively reviewed.

Results & Discussion: Of the 106 patients who had a CVMR study for suspected CES, CVMR revealed 10 thrombi in n=9 (9.7%) patients. The thrombi were located in the LAA (n=3), left ventricle (n=4) and right atrial appendage (n=3). Of these 9 patients echocardiography was positive in n=2 (22%), indeterminate in n=2 (22%) and negative in n=5 (56%) (Fig. 7). One of the 5 patients with an negative echocardiograms was obese leading to technical difficulties during the TTE. TTE and TEE was performed in 3 of the 5 negative echocardiographic studies. No thrombi were detected echocardiography that were not seen on CVMR. CVMR reported 103 non thrombotic additional findings in n=53 (57%) of patients compared to echocardiography. Sixty of these were considered significant in n=38 (40.9%) of patients. When all significant findings including thrombi were calculated there were 67 additional significant findings in n=42 (45%). Additional findings associated with thrombus formation (acute infarction, scarring and LV aneurysms) were n=19(20%) for CVMR and n=7 (7%) for echocardiography.

Conclusion: CVMR is a non invasive, reproducible method for the detection of intracardiac thrombi and is clinically advantageous in the detection of important non thrombotic findings, including prothrombotic conditions. CVMR should be considered as part of the routine evaluative framework along with echocardiography in the assessment of patients with suspected CES.

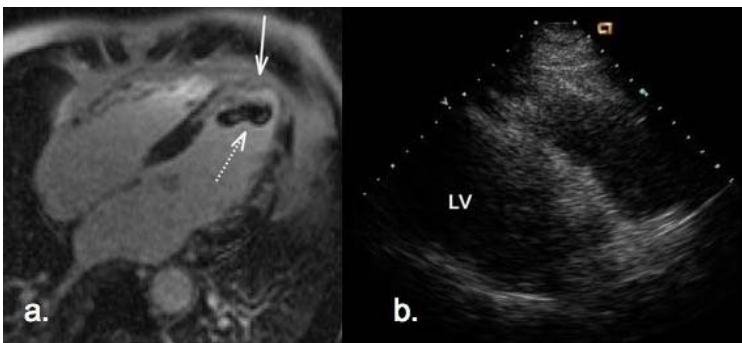


Figure 1. a. On PSIR Turbo FLASH there is a thrombus (dashed arrow) within the apical region of a mildly dilated left ventricle. This is located adjacent to a transmural infarct (arrow) b. No thrombus is identified on echocardiography.

Modality	Number	%
MR & Echo	93	
MR+	9	9.6%
Echo -	5	75%
Echo +	2	2.1%
MR -	2	0%

Table 1. Comparison of MR and echocardiography for thrombus positive studies with thrombus negative studies.
*Two of the negative MR's were suboptimal studies due to motion and prosthetic valve artifacts.

- References:**
- [1] Jungehulsing M et al. Radiology. 1992;182:225-229
 - [2] Semelka RC et al. J Magn Reson Imaging 1992;2:415-420
 - [3] Fujita N et al. Am J Card Imaging 1994;8:69-80