

Cardiac MRI and 3D Echocardiography in acute rheumatic carditis

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Introduction: The purpose of this study was to evaluate the usefulness of 3D echocardiography and cardiac MRI, to assess the structural and functional changes in mitral valve apparatus during an episode of acute rheumatic fever.

Methods: Twenty two consecutive cases of acute rheumatic fever (mean age 12.15 ± 4.2 years) with carditis were enrolled in the study. Baseline investigations and a 3D echocardiographic study were done. The follow-up echocardiograms were repeated after 4 weeks of steroid therapy in 16 patients. Age-matched chronic rheumatic mitral regurgitation patients were included as controls. Seven successive patients with acute rheumatic carditis also underwent cardiovascular MRI with gadolinium enhancement.

Results: Twelve (55 %) patients had evidence of rheumatic nodules on echocardiography, while none of the controls had rheumatic nodules. 3D echocardiography showed a diffuse nodular appearance of mitral leaflet surface during activity in contrast to the glistening appearance seen in chronic RHD. The thickness of leaflets at tip, mid part and base of anterior/posterior leaflets during acute activity was higher than the control. The thickness of the mid-part of anterior mitral leaflet was 5.1 ± 0.6 mm in the study group initially and 4.9 ± 0.96 mm on follow up, while the control group had a thickness of 3.87 ± 0.8 mm ($p = 0.008$).

On cardiac MRI, global increase in signal intensity in T2W imaging was found in 28.5 % (2/7) of our patients of acute rheumatic fever. All 7 patients have shown late gadolinium enhancement (LGE) indicating the presence of myocardial damage. The LGE was seen in all the patients, in posterior wall of left atrium and mitral valve, involvement of tricuspid valve was seen in 57.1 % (4/7 cases) while one patient showed LGE in LV endocardium.

Conclusions:

3D echocardiography complements 2D echocardiography in the evaluation of patients presenting with rheumatic fever. Nodular appearance and leaflet thickening are important echocardiographic features of rheumatic carditis. Cardiac MRI shows some characteristic features in rheumatic carditis. Whether these findings are helpful in differentiating acute carditis from chronic RHD needs to be investigated further.