3D visualization of a large left ventricular apical aneurysm

Clinical Case Portal

Date of publication:

22 Nov 2006

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Case Report

We report a case of visualization of a large left ventricular apical aneurysm using different 3D display techniques.

Patient history prior to current observation :

68 years-old, woman, with history of coronary artery disease (antero-septal myocardial infarction in 1985, inferior relapse in 1992 treated with PTCA + stent on right coronary artery, moderate left ventricular systolic dysfunction and apical aneurysm) admitted for typical angina.

Clinical findings on admission, evolution and outcome :

A 2D (fig. 1, fig. 2, fig. 3) and 3D (fig. 4, fig. 5, fig. 6) rest echocardiogram was performed to assess left ventricular (LV) regional and global systolic function.

Conclusion

True ventricular aneurysms are mechanical complications of myocardial infarctions and arise from expansion and thinning of transmural infarcted tissue (1). Several 3D display techniques are available to visualize left ventricular morphology and function (2,3). Using the surface rendering technique, a mathematical model or cast of the left ventricle is obtained from endocardial border tracing (fig. 4). With this technique the surfaces of the left ventricle are displayed as a solid structure. This technique is used mainly for volume and systolic function analysis. Using the full-volume data-set, we may analyze the anatomy and regional function of the left ventricle. Using electronic tools, we can crop away the anterior wall of the left ventricle and obtain the 3D-echo shape of a four-chamber view using the rendering technique to show the anatomical details of the large apical aneurysm (fig. 5). Otherwise, we can electronically section the 3D data-set of the left ventricle in 9 transversal equidistant short axis views of the left ventricle (fig. 6) from the base (right lower panel showing the mitral valve) to the apex (left upper panel) and appreciate detailed regional wall motion and the areas of the left ventricular short axis at different levels. Note the larger areas, thinned walls and wall motion at apical level.

References

1. Massad GM et al. Surgical repair of mechanical complications of myocardial infarction. World J Surg 2004; 28:847-856.

2. Qin JX et al. Validation of real-time three-dimensional echocardiography for quantifying left ventricular volumes in the presence of a left ventricular aneurysm: in vitro and in vivo studies. JACC 2000; 36(3):900-7.

3. Monaghan MJ. Role of real time 3D echocardiography in evaluating the left ventricle. Heart 2006; 92(1):131-6.

Video 1 :
Left ventricle apical aneurysm_Transthoracic parasternal long-axis view

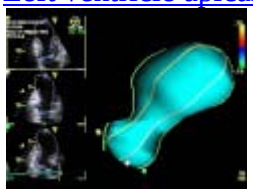
Video 2 :
Left ventricle apical aneurysm_Transthoracic apical four-chamber view

Video 3 :

Left ventricle apical aneurysm_Transthoracic apical two-chamber view

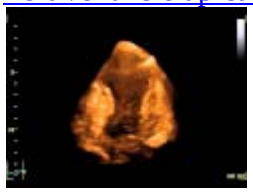
Video 4 :

Left ventricle apical aneurysm_Left ventricle cast



Video 5 :

Left ventricle apical aneurysm_3D full volume mode acquisition from apical approach



Video 6 :

Left ventricle apical aneurysm_Transthoracic 3D echo 9-slice view