

Scientific Poster

## **C-244 MRI in monitoring of aortic and mitral valve surgery results**

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**Topic:** Cardiac

## **Purpose**

To define the role of MRI in examination of patients after valve surgery for assessment of heart chambers remodelling and prosthetic valves functioning.

## Methods and Materials

MRI was performed with a 1.0 T MR imager using ECG-gated T1-SE (or T1-TSE), bright-blood GRE-CINE-technique and phase-contrast MRI. Maximum and minimum volumes of left atrium (LA), LA total emptying volume, left ventricle (LV) end-diastolic volume (EDV), LV end-systolic volume (ESV), LV stroke volume (SV), LV ejection fraction were measured and calculated.

44 patients (males 26, females 18; mean age – 51,6 yrs, range 32-67) with mitral and aortic prostheses were examined. 17 pts had aortic prosthetic valves, 19 – mitral valves, 8 – both (aortic and mitral).

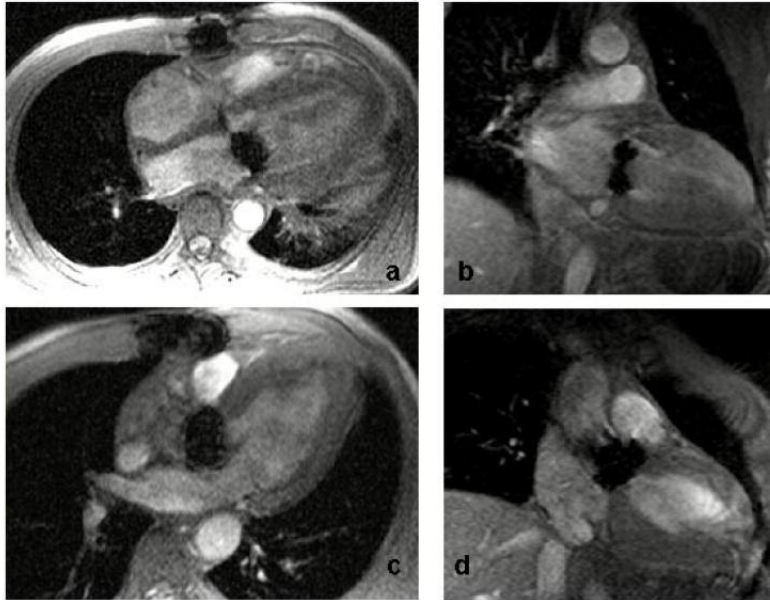
6 of 27 implanted in the mitral position and 8 of 25 implanted in the aortal one prosthese were tilting discs MIKS (Russia). All the rest prostheses (38) were different modifications of bileaflets Carbomedics (USA).

MRI has been done twice – 10-20 days and 12-24 months after surgery - to all 44 patients. 20 patients were examined before surgery.

## Results

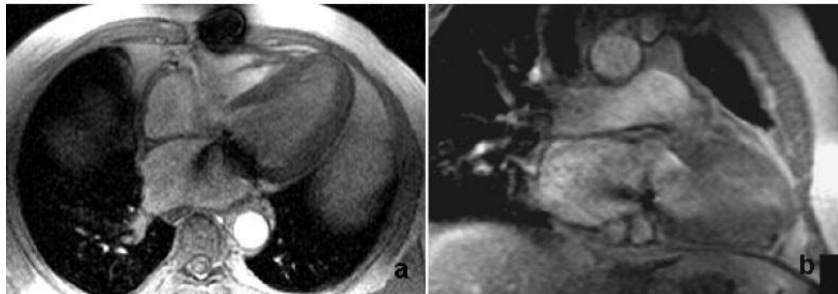
Low-intensity artifacts were defined in the area of prostheses and at the sternum.

Narrow flow of low signal intensity (click [here](#) \*Links to file type VIDEO/AVI not available in PDF Version to see cine-loop) along the prosthesis leaflets corresponded to normal function of the prosthesis (48 of 52 valves).



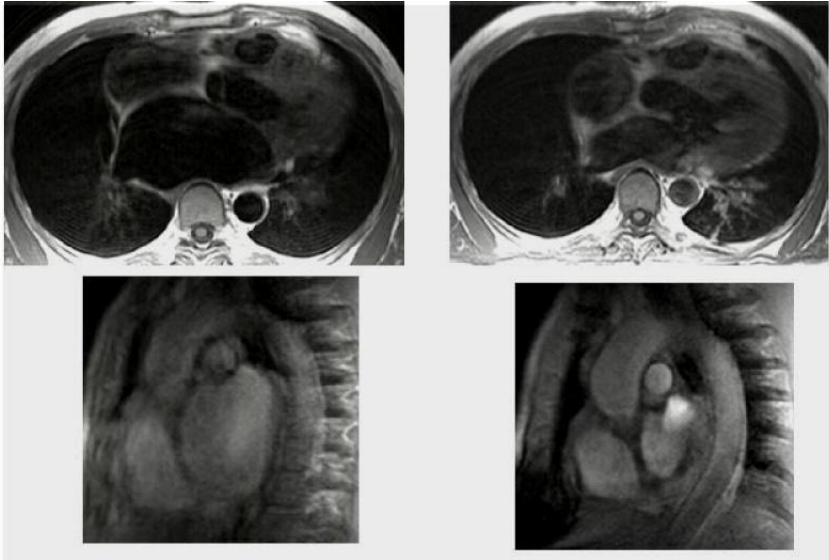
Annotation: Normal functioning of mitral (a-b) and aortic (c-d) prostheses.

3 patients with mitral valve prostheses had paravalvular leaks (click [here](#) \*Links to file type VIDEO/AVI not available in PDF Version to see cine-loop) located near by the anterior leaflets of mitral prostheses. The volume of fistulae ranged from 30ml to 50ml.



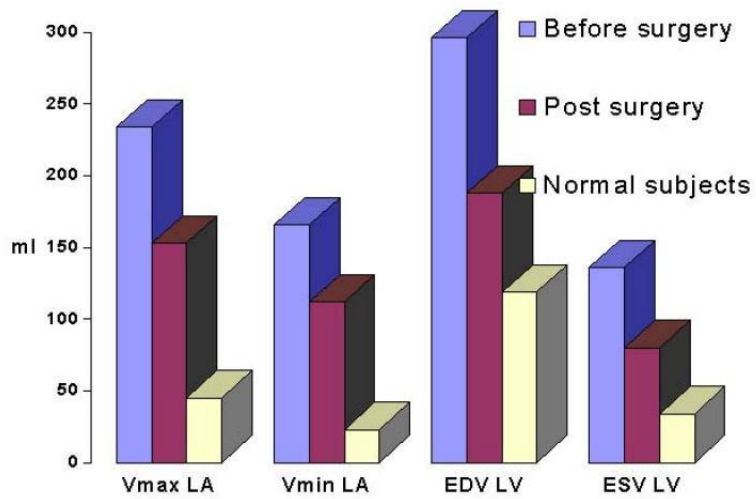
Annotation: Paravalvular fistula located at the site of anterior leaflet.

In patients with giant left atrium (LA) normal LA shape and size were restored by symmetrical "Mercedesz"-plastics of the posterior LA wall in 13 patients.



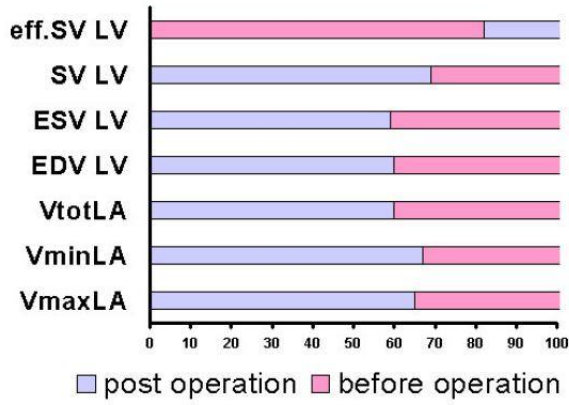
Annotation: Patient with large LA. Reduction of LA size after surgery ("Mercedes"-plasty of LA).

The reduction of LA dimensions varied within the range from 22% to 45% of initial LA size, mean - 32%.



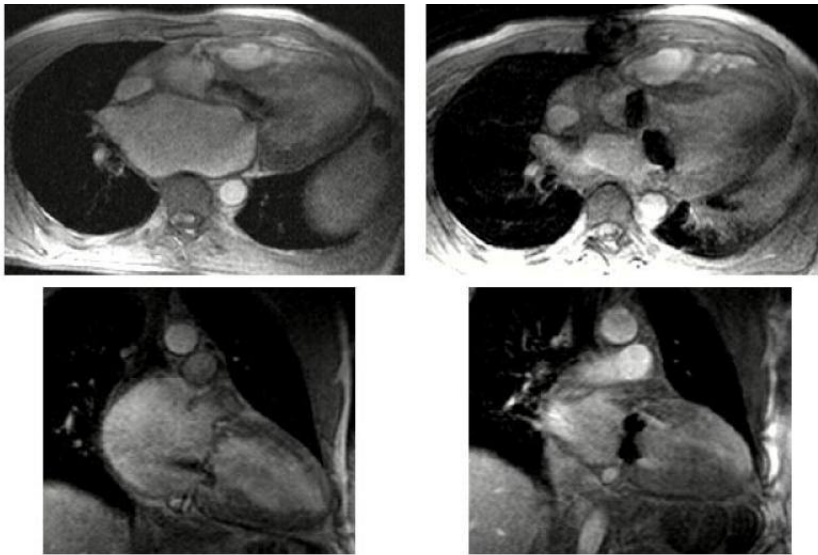
Annotation: Reduction of left atrium and left ventricle size after surgery

**THE REDUCTION (in per cent) OF LEFT ATRIAL AND LEFT VENTRICULAR VOLUMES**



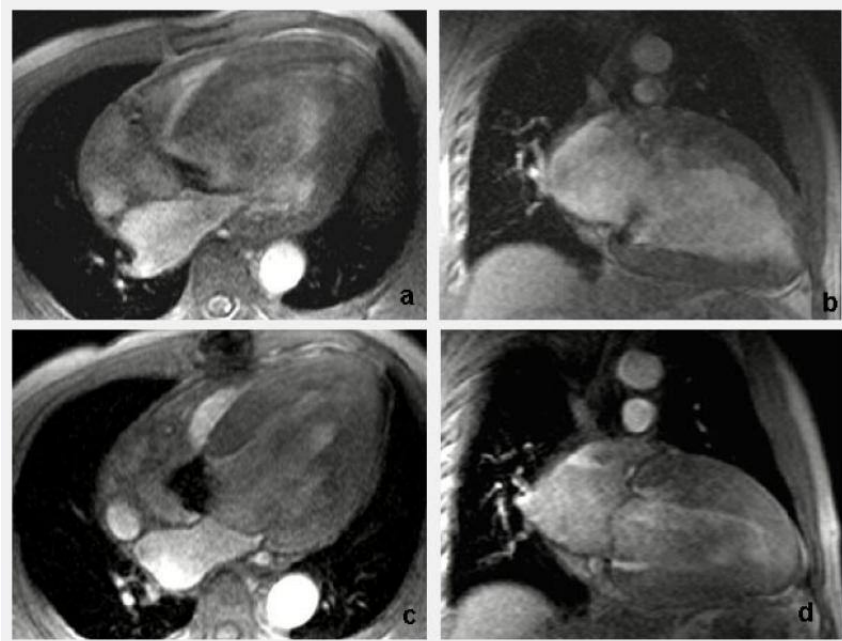
Annotation: Left atrium and left ventricle volumes reduction after surgery

In patients with mitral valve incompetence and/or mitral stenosis strut chordae sparing isolated replacement of the mitral leaflets (SChS-MLR) has been used.



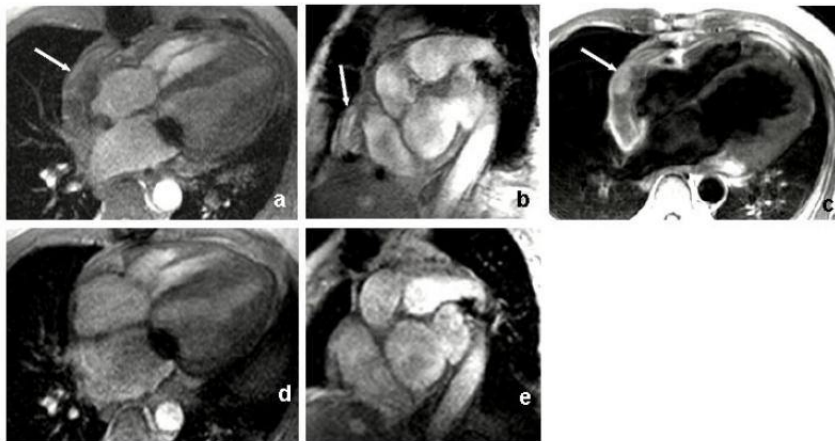
Annotation: Patient with mitral and aortic insufficiency. After surgery - normal functioning of mitral and aortic prosthetic valves.

The end-diastolic volume and long axis dimension of left ventricle (LV) after aortic valve surgery had positive dynamics, the mean reduction of LV dimensions was 29% of initial LV size (range 7%-45%).



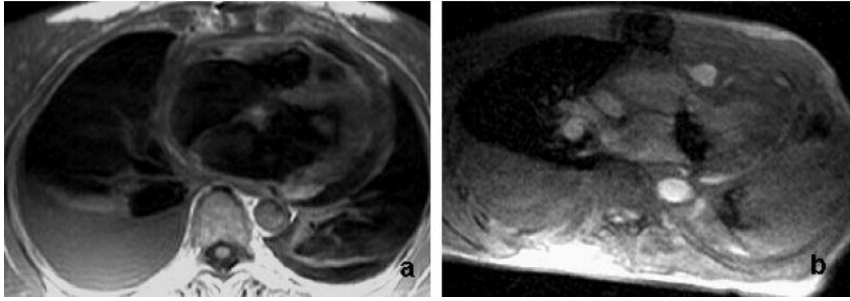
Annotation: (a-b) Patient with aortic insufficiency, dilation of LV (EDS - 9,6 cm). (c-d) Normal functioning of aortal valve prosthesis, 25% reduction of LV size after surgery (EDS - 7,2 cm).

MRI was able to diagnose such postoperative signs as intrapericardial haematoma (2);



Annotation: Intrapericardial haematoma near right atrium wall (arrow in the fig a-c). (a), (b), (c) - 2 weeks after surgery (d), (e) - 1 year after surgery. Elimination of haematoma

pleural (5) or pericardial (2) effusion, lung atelectasis (7).



Annotation: Patient with pericardial and pleural effusion, atelectasis of the right lung



## **Conclusion**

MRI could give an objective information about heart morphology (chamber dimensions and volumes, hypertrophy degree) and mechanical valve functioning (normal and abnormal flow) in patients after surgery. It can be safely performed in patients with artificial heart valves in early postoperative period. It is noninvasive, can be easily performed without the need for intravenous injections and may be used to follow patient long term. Main privilege is any plane of scanning.

## References

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# Keywords

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Mitral Valve Insufficiency

C14.280.484.095

Aortic Valve Insufficiency

## **Own Keywords:**

Mitral prosthesis, aortic prosthesis, paravalvular fistula

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