



IMAGE

Mitral regurgitation mechanism assessed by 2D and 3D echocardiography in patient with an abnormal left coronary artery arising from the pulmonary artery

Mécanismes de la régurgitation mitrale évaluée par échographie 2D et 3D chez un patient avec une artère coronaire gauche naissant de l'artère pulmonaire

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tridimensionnelle

Case presentation

A two-month-old male infant presented with cardiac heart failure. Two-dimensional (2D) echocardiography showed an anomaly of the left coronary artery (LCA) arising from the pulmonary artery (Fig. 1) with mitral regurgitation (Fig. 2). Three-dimensional (3D) echocardiography was performed to determine left ventricular (LV) volume (i.e., 33, paediatric matrix probe 2–7 MHz, Philips). The global and regional function of the left ventricle were analysed with the Q-LAB 4.2 system (Philips). LV ejection fraction was 54% with poor anterolateral contraction (Fig. 3). The 2D apical 4-chamber view depicted a restrictive motion of the mitral valve with hyperechogenicity of the anterolateral papillary muscle (Fig. 4).

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Figure 1. 2D preoperative echocardiography in the parasternal short axis view showing the LCA arising from the pulmonary artery (PA) and not from the aorta (Ao).

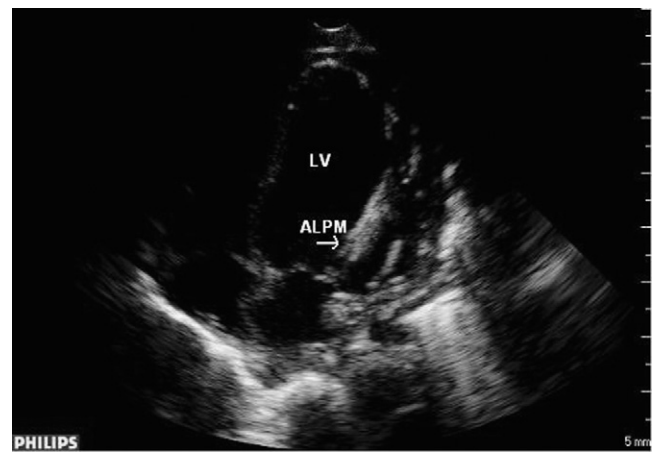


Figure 4. 2D preoperative echocardiography in the 4-chamber view showing restrictive motion of the mitral valve with hyper-echogenicity of the anterolateral papillary muscle (ALPM). Left ventricle (LV).

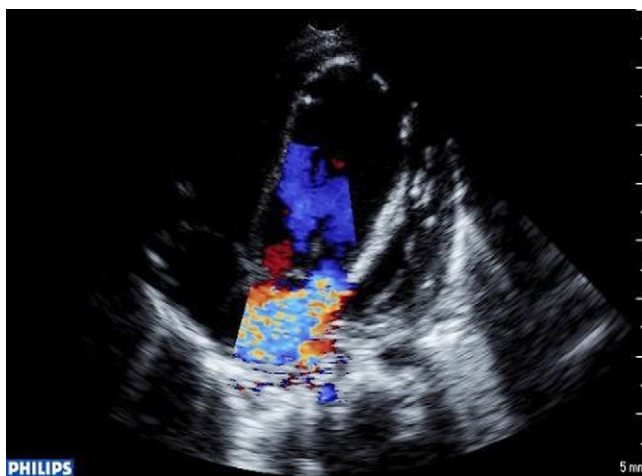


Figure 2. 2D-colour doppler preoperative echocardiography in the 4-chamber view showing mitral regurgitation.



Figure 5. 2D postoperative echocardiography in the parasternal short axis view showing the left coronary anastomosis (LCA) to the aorta (Ao).

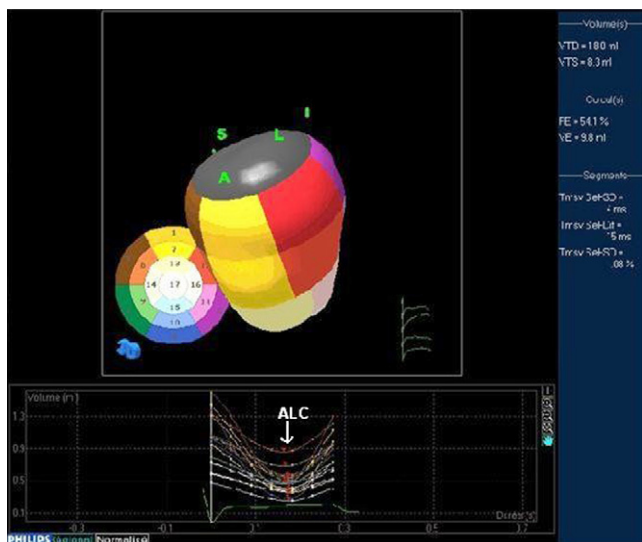


Figure 3. 3D echocardiography in the preoperative period quantifying Left ventricle (LV) volume. Anterolateral contraction (ALC).

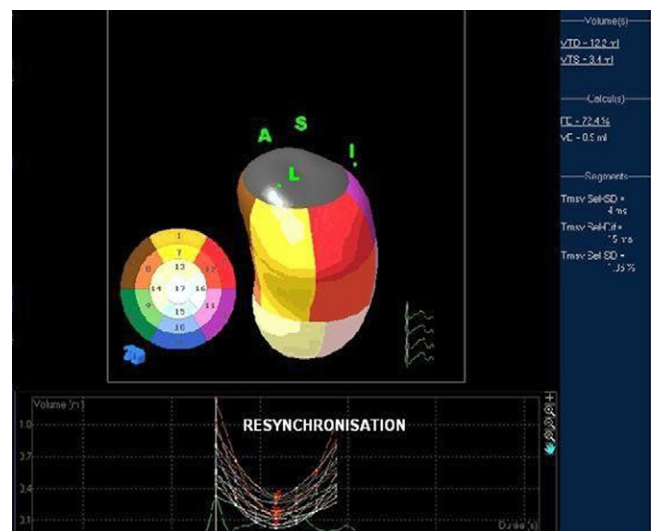


Figure 6. 3D echocardiography in the postoperative period showing Left ventricle (LV) resynchronization.

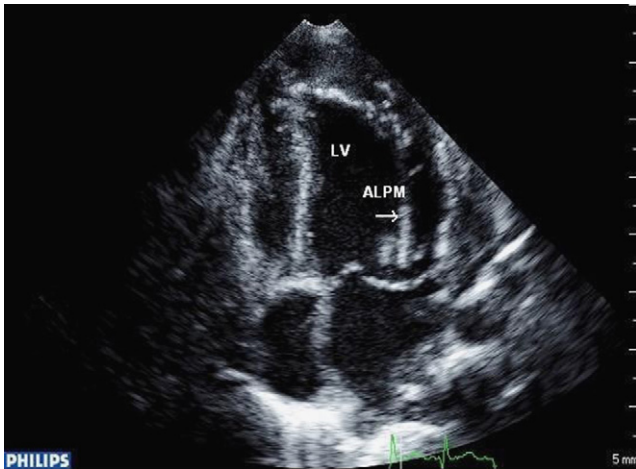


Figure 7. 2D postoperative echocardiography in the 4-chamber view showing mitral valve prolapse with persistence of the hyperechogenicity of the anterolateral papillary muscle (ALPM).

The patient underwent surgical repair with a left coronary anastomosis to the aorta. Mitral valve repair was not performed during the initial surgery. Three months later, the patient had no cardiac symptoms. 2D and 3D echocardiography were repeated. LCA anastomosis to the aorta was visualized without stenosis (Fig. 5). LV ejection fraction was 72% with normal regional contraction (Fig. 6). 2D echocardiography depicted mitral regurgitation with bileaflet mitral valve prolapse (Fig. 7). The papillary muscle conserved its ischaemic aspect. The patient is being followed up and has not yet required mitral valve repair.

Discussion

The LCA arising from the pulmonary artery is a very rare malformation (1/300,000 babies born). Myocardial dyssyn-

chry and mitral regurgitation are frequently reported in such cases. To the authors' knowledge, the mitral regurgitation mechanism has not been described previously. Both regional dysfunction of the myocardium and the papillary muscle created a restrictive motion of the mitral valve in the preoperative period. In previous reports [1,2], mitral valve plasty associated with the revascularization has been attempted, with increased postoperative mortality. Most surgical teams performed an isolated surgical reimplantation of the LCA to the aorta waiting myocardial recovery before valvuloplasty.

Our case demonstrated that myocardial resynchrony preceded papillary muscle function recovery. This delay could explain the mitral leaflet prolapse due to the absence of chordae tension. In our patient, we attempt reduction of the mitral regurgitation with papillary muscle function recovery.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.acvd.2008.06.006](https://doi.org/10.1016/j.acvd.2008.06.006).

References

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