How-to-do-it

A novel technique for giant left atrium reduction

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Abstract

We herein describe a safe and reproducible technique for left atrial volume reduction in patients with a giant left atrium. In a 56-year-old patient undergoing redo mitral valve replacement, the left atrium measured 18 × 20 × 17 cm occupying the middle-lower segment of the right hemithorax with compression of the adjacent organs. The left atrial volume was reduced by triangular resections of the atrial wall and the mitral valve was replaced using a mechanical prosthesis. The postoperative course was uneventful and the left atrial diameter was 11.2 cm at the latest control.

Keywords: Atriumegaly; Left atrial reduction; Mitral valve replacement

1. Clinical and operative data

A 56-year-old man was operated on for mitral valve replacement and left atrial volume reduction. He previously underwent mitral valve repair with implantation of a Carpentier ring and replacement of chordae tendineae. At hospital admission the patient was asymptomatic and the echocardiographic study showed good left ventricular function with a left ventricular end diastolic diameter of 73 mm, massive mitral regurgitation and a left atrial diameter of 17 cm. Magnetic resonance revealed a left atrial size of 18 × 20 × 17 cm without endocavitary thrombosis and nearly total occupation of the middle-lower portion of the right hemithorax with compression of the right cardiac chambers, caval veins, pulmonary artery, right main bronchus, esophagus, descending aorta and right hemidiaphragm (Fig. 1A).

After median sternotomy, the heart and the caval veins in particular were cleared from all their adhesions and the cardiopulmonary bypass was started. The Søndergaard plane was then isolated and another portion of the left atrium roof was delivered from its reflection into the interatrial septum. The left atriotomy was performed parallel to the atrial septum and extended posteriorly to the inferior vena cava and superiorly to the left atrial roof and to the left trigone of the mitral valve. A large triangular segment of left atrium with the base on the posterior portion of the atriotomy and the apex towards the outlet of the left pulmonary veins was removed (Fig. 2c). Another two triangular segments of atrium, both with the base on the atriotomy, were removed (Fig. 2a,b). The incisions on the left atrium walls were repaired with a continuous suture of Prolene 3/0. The Carpentier ring was removed together with the anterior leaflet of the mitral valve and its chordae, the posterior leaflet was preserved, and a 31 mm Sulzer Carbomedics mechanical prosthesis was implanted. The left appendage was tied from outside and the left atriotomy was repaired as usual, removing simultaneously a large stripe of the reflection of the left atrium into the interatrial septum.

The patient made an uncomplicated recovery without respiratory failure secondary to the compression of the right lung or bronchus or signs of low cardiac output syndrome. The left atrial diameter was 11 cm and the left ventricular end diastolic diameter was reduced to 64 mm at the echocardiogram performed before discharge. The patient was well enough to go home 9 days after the operation. At the control after 60 days from operation, the magnetic resonance showed a clear reduction of the left atrial dimensions (10.6 × 11.2 cm) with a good expansion of the right pulmonary base (Fig. 1B).

2. Comment

We reported a new, simple and effective surgical technique to reduce the left atrial volume in patients with a giant left atrium.

Isomura et al. [1] defined ‘giant’ as an atrium with a
maximum diameter of \(>6\) cm on echocardiography. The dilatation of the left atrium is not secondary only to mitral regurgitation, even if massive, but it could also be related to a primary pathology of the left atrial wall itself [2].

The increased left atrial compliance with consequent left atrial dilatation in patients with mitral valve pathology may avoid pulmonary hypertension as in the present case. The surgical indication was based on the left ventricular dilatation and on the entity of the mitral regurgitation, but especially on the enormous dimensions of the left atrium. In fact, the presence of a giant left atrium increases the thromboembolic risk in spite of anticoagulant therapy, and the compression of the adjacent organs can cause recurrent bronchopneumonia, dysphagia, etc. [3].

The surgical techniques to reduce the left atrium are different, from the plication of the posterior wall of the atrium along the outlet area of the pulmonary veins [1–3], to the autotransplantation [4]. In this patient we performed triangular resections of the atrial walls with a simple and direct continuous suture drawn near them, obtaining a reduction of 40% of the left atrial volume. We believe it was important to isolate the heart from its adhesions, especially the left atrium from the caval veins, its roof from the reflection in the interatrial septum and the outlet of the pulmonary veins too. This allowed us to perform triangular resections with the base on the atriotomy and the apex variously directed. The efficacy of the technique described was demonstrated not only by routine investigations but also from the immediate postoperative course without any sign of low cardiac output syndrome secondary to compression of the left atrium and left ventricle and without respiratory failure during weaning from the ventilatory support.

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**References**

