The control of a reconstructed pulmonary valve with a pericardial patch using multislice computed tomography

Perikardiyal yama ile rekonstrükte edilen pulmoner kapağın çokkesitli bilgisayarlı tomografi ile kontrolü

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Left parasternal systolic ejection murmur was detected in the physical examination of a 24-year-old woman with dyspnea. Transthoracic echocardiography and cine-angiography revealed infundibular, valvular pulmonary stenosis and a small subaortic ventricular septal defect. Infundibular resection, transannular pericardial patch replacement and pulmonary valve reconstruction with pericardium were performed. New pulmonary valve was evaluated with multislice computed tomography.

Key words: Cardiac valve; computed tomography; pulmonary regurgitation.

Yirmi dört yaşındaki dispneli bir kadın hastanın fizik muayenesinde sol parasternal sistolik ejeksiyon üfürümü saptandı. Transtorasik ekokardiyografi ve sineanjiyografide infundibüler valvüler pulmoner stenoz ve küçük bir subaortik ventriküler septal defekt saptandı. İnfundibüler rezeksiyon, perikard ile transanüler yama replasmanı ve perikardla pulmoner kapak rekonstrüksiyonu yapıldı. Yeni pulmoner kapak çokkesitli bilgisayarlı tomografi ile değerlendirildi.

Anahtar sözcükler: Kalp kapağı; bilgisayarlı tomografi; akciğer yetersizliği.

Multi-slice computed tomography (MSCT) is becoming one of the standard methods for diagnosis and follow up of cardiovascular diseases. Pulmonary valve stenosis and atresia with or without other congenital cardiac defects are seen frequently in daily practice by cardiovascular surgeons. In surgical treatment, infundibular muscle resection, pulmonary valvulotomy and transannular patch replacement are performed, but pulmonary regurgitation and right ventricular volume overload are inevitable after this procedure.[1] To circumvent this problem, various techniques like monocusp reconstruction and homograft replacement have been used.

CASE REPORT

A 24-year-old woman was operated on for infundibular and pulmonary valvular stenosis and a small ventricular septal defect (VSD). The ventricular septal defect was closed primarily. For annulus and infundibular enlargement a transannular pericardial patch was used, so the anterior pulmonary leaflet had to be incised in midline. This leaflet was reconstructed with another pericardial patch. This reconstruction was successfully controlled with MSCT.

In the operation the anterior leaflet and annulus were incised. The pulmonary annulus, main pulmonary artery and infundibulum were enlarged with a glutaraldehyde treated pericardial patch. Another piece of glutaraldehyde treated pericardium was sutured to the divided anterior pulmonary valve and transannular patch, so a new valve was reconstructed to prevent residual pulmonary regurgitation. Cardiac data were acquired with electrocardiography (ECG)-gated multi-detector computed tomography (CT) scanner (GE 64, VCT, GE Healthcare, USA) and images were reconstructed in a workstation by cardiac software (Advantage workstation 4.2-0.6).

The patient was in New York Heart Association class 1 status one-year after the operation. Echocardiography revealed minimal pulmonary regurgitation. In MSCT the valve was observed while the heart was working. A minimal coaptation defect of the reconstructed pulmonary valve was seen clearly at diastole (Fig. 1). The reconstructed pulmonary valve opening was also shown not to restrict the right ventricular outflow tract (Fig. 2). Valve areas were easily measured at systole and diastole. Angioscopic view of the valve was also obtained very successfully (Fig. 3).

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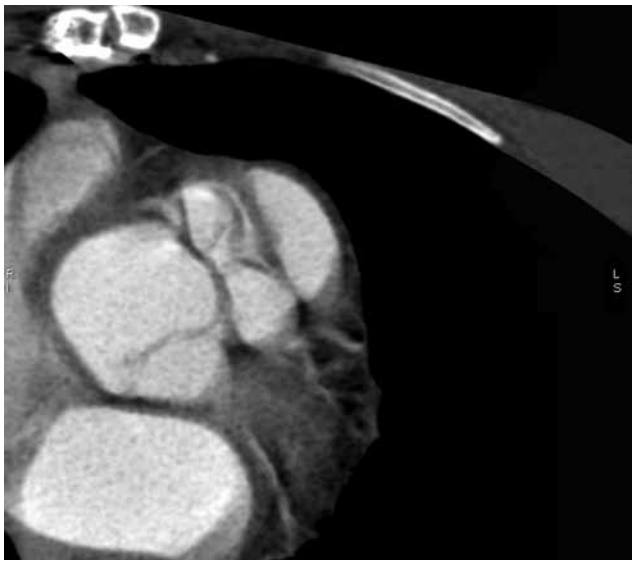

Fig. 1. Minimal coaptation defect of the reconstructed pulmonary valve.

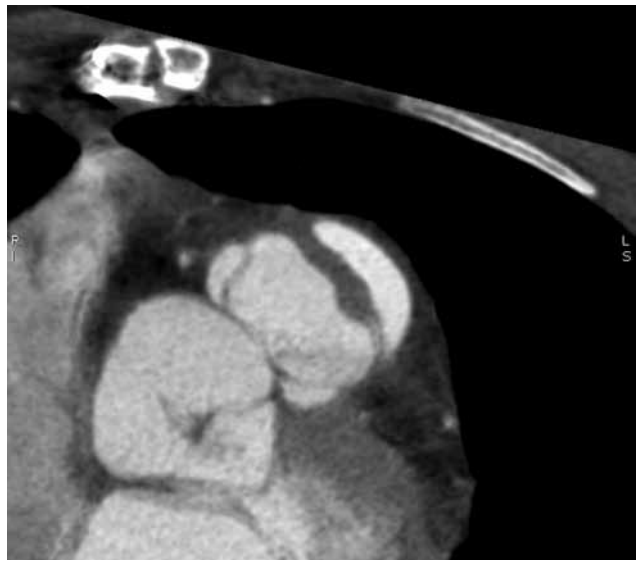

Fig. 2. Systolic opening of the reconstructed pulmonary valve.

DISCUSSION

Bove et al.[2] reported right ventricular outflow tract enlargement with transannular patching. When a transannular patch has been used in repair, the ejection fraction decreases and pulmonary regurgitation causes right ventricular volume overload, increased wall thickness and decreased compliance.[3,4] Sclerotic and stenotic pulmonary valves are not suitable for reconstruction. Because pulmonary valve structure was normal, reconstruction of the native valve with a pericardial patch, other than monocusp construction or homograft replacement was the most appropriate method for this patient. Postoperative follow-up echocardiography showed minimal pulmonary regurgitation but was not successful in showing the pulmonary valve structure. We believe that MSCT will enlighten intracardiac structures in complex congenital cardiac defects in the near future.

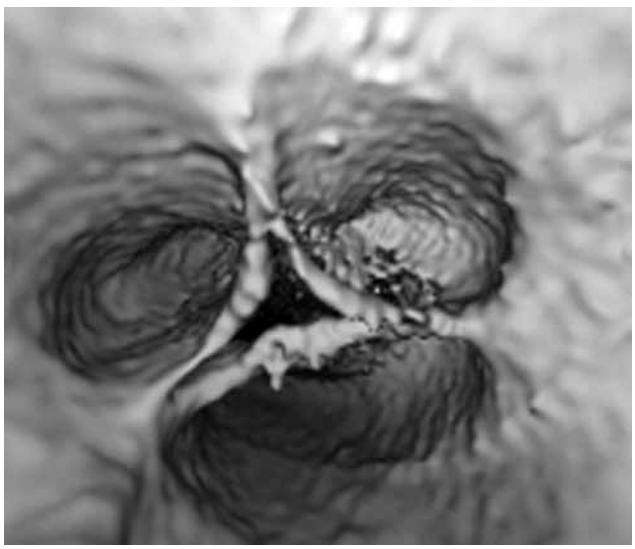

Fig. 3. Angioscopic view of the reconstructed pulmonary valve at the begining of the diastole.

Declaration of conflicting interests

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