

## A rare indication for Senning operation: Isolated ventricular inversion and ventricular septal defect

A 9-year-old patient who weighed 19 kg presented to our clinic because of low saturation. His medical history revealed that he was under clinical follow-up, with no surgical procedures performed thus far. The oxygen saturation was 68% and clubbing was present. The patient was at the functional stage-3 level in clinical terms. Transthoracic echocardiographic evaluation showed atrial situs solitus, atrioventricular (AV) discordance, ventriculoarterial concordance, and large ventricular septal defects (Fig. 1a, b). The cardiac catheterization (Fig. 1c, d) and contrast-enhanced multidetector computed tomography (Fig. 1e, f) findings were also consistent with the echocardiography results. Based on these findings, a palliative Senning operation was performed on the patient (Fig. 2a, b). No problems were observed in the postoperative process. The patient's oxygen saturation rose to 98%, and he currently completed his third post-operative year. He is under follow-up in the functional stage-2 status.

Isolated ventricular inversion or discordant atrioventricular connection with concordant ventriculoarterial connection is a rare form of congenital heart disease that generally manifests during the neonatal period or infancy. Hemodynamically, this anomaly results in parallel circulation, similar to that of transposition of the great arteries; hence, most cases present with cyanosis and congestive cardiac failure in infancy. Without corrective surgery, survival beyond infancy is rare. Ventricular septal defect is a common association of this anomaly. Complete AV canal defect, interruption of the inferior vena cava, patent ductus arteriosus, left atrial isomerism, tricuspid stenosis, supra-valvar tricuspid ring, and coarctation are the associated anomalies that have been described with isolated ventricular inversion. The morphological left ventricle remains the systemic ventricle; hence, there is no later risk of systemic ventricular dysfunction or systemic AV valve regurgitation. Intra-atrial baffle surgery (Senning or Mustard operation) physiologically corrects the circulation. Accordingly, our patient underwent the Senning procedure and clinical improvement was obtained.

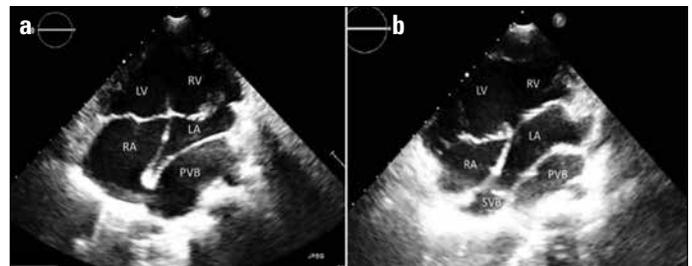
**Murat Saygi, Aysel Türkvtan\*, Ersin Ereke\*\*, Ender Ödemiş,  
Alper Güzeltaş**  
Departments of Pediatric Cardiology, \*Radiology,  
\*\*Cardiovascular Surgery, Mehmet Akif Ersoy Cardiovascular  
Research and Training Hospital; İstanbul-Turkey

**Address for Correspondence:** Dr. Murat Saygi,  
Mehmet Akif Ersoy Eğitim ve Araştırma Hastanesi, Pediatrik Kardiyoloji  
Bölümü Turgut Özal Bulvarı, 34303, Halkalı, İstanbul-Türkiye  
Phone: +90 212 692 20 00  
Fax: +90 212 471 94 94  
E-mail: saygimrt@gmail.com  
©Copyright 2015 by Turkish Society of Cardiology - Available online at [www.anatoljcardiol.com](http://www.anatoljcardiol.com)  
DOI:10.5152/akd.2015.6432



**Figure 1. a-f. The transthoracic echocardiography (a, b), cardiac catheterization (c, d), and computed tomography angiography scans (e, f) obtained from the patient in the postoperative process indicates atrioventricular discordance, ventriculoarterial concordance, and large VSD**

Ao - aorta; LA - left atrium; LLPV - left lower pulmonary vein; LPA - left pulmonary artery; LV - left ventricle; MB - moderator band; MPA - main pulmonary artery; PA - pulmonary artery; RA - right atrium; RPA - right pulmonary artery; RUPV - right upper pulmonary vein; RV - right ventricle



**Figure 2. a, b. The transthoracic echocardiography scan taken after the Senning operation showed that the systemic venous flow was routed to the left atrium through the systemic venous baffle, whereas the pulmonary venous flow was routed to the right atrium by means of the pulmonary venous baffle**

LA - left atrium; LV - left ventricle; PVB - pulmonary venous baffle; RA - right atrium; RV - right ventricle; SVB - systemic venous baffle