

## Patent ductus arteriosus with right-to-left shunt can be diagnosed by direct visualization of microbubbles passage into descending aorta during contrast echocardiography

*Sağdan sola şanlı duktus arteriyozus açıklığı kontrast ekokardiyografi sırasında mikrobaloncukların inen aortaya geçişin direkt görüntülemesi ile teşhis edilebilir*

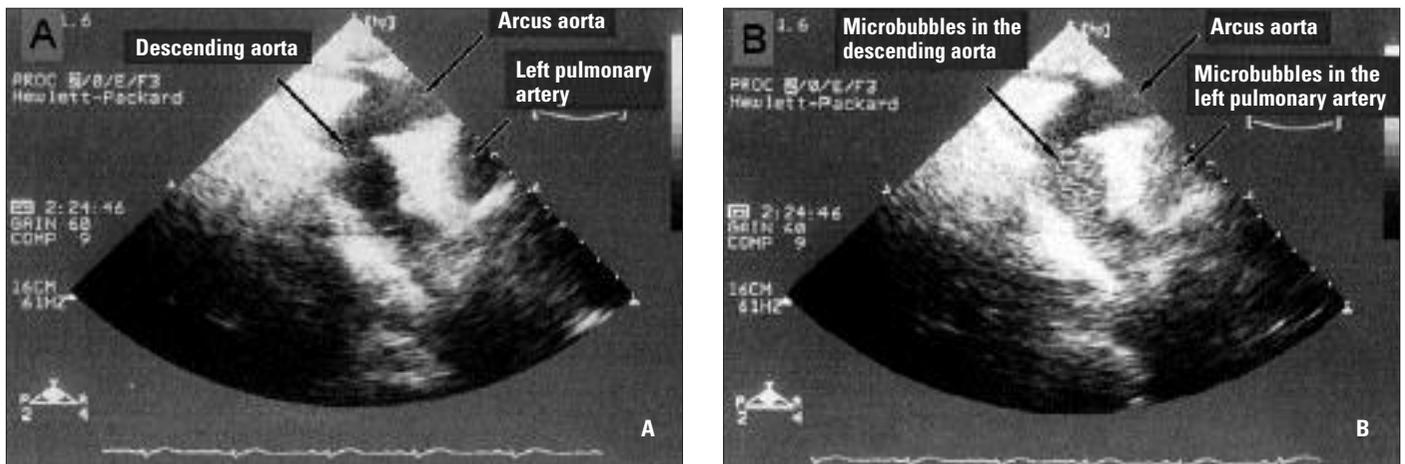
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When patent ductus arteriosus (PDA) is complicated by pulmonary hypertension resulting in a right-to-left shunt, an erroneous diagnosis of primary pulmonary hypertension may be made, even after echocardiographic examination, because lack of typical color flow associated with PDA (1). Methods for diagnosis of PDA with right-to-left shunt include cardiac catheterization, transesophageal echocardiography, comparison of right brachial and femoral artery blood gases, computerized tomography, and magnetic resonance imaging (1-4). But, these methods are semi-invasive, invasive or expensive.

A 47-year-old woman had dyspnea on exertion. On physical examination vital signs were as follows; heart rate 95 bpm and regular, blood pressure 90/50 mmHg, respiration rate 18 breath/minute. On auscultation an intense second heart sound on the pulmonary area, a grade 3/6 pansystolic murmur in the

pulmonary, tricuspid and mesocardiac areas were found. Her left hand and both feet were cyanotic. Normal sinus rhythm, right axis, p-pulmonale, right bundle branch block and right ventricular hypertrophy were seen on the electrocardiogram. The chest radiography demonstrated clear lung fields, prominent pulmonary arterial conus, calcification between aortic and pulmonary arch, and moderate cardiomegaly. On the transthoracic echocardiographic examination, right ventricular dilatation and hypertrophy, pulmonary arterial and biatrial enlargement, and high pulmonary arterial pressure (systolic 120 mmHg) were detected. No any congenital heart disease was detected. Two-dimensional and color flow Doppler images of the main pulmonary artery by parasternal approach did not reveal evidence of PDA. After intravenous injection of agitated saline into the right brachial vein, no shunt was visu-



**Figure 1.** Contrast echocardiographic images in a patient with patent ductus arteriosus with right-to-left shunt from suprasternal long axis view. **A,** Before contrast. **B,** During contrast injection, the passage of microbubbles from patent ductus arteriosus results in opacification of the descending aorta, however, ascending aorta is not opacified.

alized across the atria or ventricles. But, when injection of agitated saline was repeated during suprasternal long-axis viewing, ejection of microbubbles from ductal region into the descending aorta was seen (Fig. 1). Thereby, diagnosis of PDA with right-to-left shunt was made. The diagnosis was confirmed by cardiac catheterization. According to findings of the catheterization, patient had PDA with Eisenmenger's syndrome.

We suggest the usefulness of suprasternal long-axis approach during contrast echocardiography in patients with suspected PDA with right-to-left shunt. Ejection of microbubbles from PDA into the descending aorta can be directly seen by this approach.

## References

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