CASE REPORT

Spontaneous echocardiographic contrast due to ductus venosus

Duktus venozus nedeniyle saptanan spontan ekokardiyografik kontrastlanma

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Summary– Spontaneous echocardiographic contrast is defined as a phenomenon of discrete reflections appearing in the cardiac chambers or great vessels. It has been associated with several conditions leading to microbubble formation or low blood flow. This is a report of a neonate with spontaneous echocardiographic contrast related to patent ductus venosus.

Özet– Spontan ekokardiyografik kontrastlanma kalp boşluklarında ve büyük damarlarda gözlenen hiperekojen görünümde yansımalar olarak tanımlanan bir durumdur. Mikro kabarcık oluşumu veya düşük kan akımı ile ilişkili bir çok durumda gözlenebilir. Bu yazıda, duktus venozus ile ilişkili spontan ekokardiyografik kontrastlanma saptanan bir yenidoğan sunuldu.

Spontaneous echocardiographic contrast is defined as a phenomenon of discrete reflections appearing in the cardiac chambers or great vessels in the absence of any intravascular injection or any event leading to development of intravascular gas.[1] It has been reported in association with constrictive pericarditis, microbubbles originating from the gastrointestinal tract, microthrombi, and low blood flow states, such as mitral valve or tricuspid valvular disease, or dilated, poorly functioning left or right ventricle.[2] Presently described is rare pediatric entity: spontaneous echocardiographic contrast in a neonate associated with patent ductus venosus.

CASE REPORT

Mature neonate was born to 27-year-old white female at 40 weeks gestation and weighed 3310 g. Mother was not followed-up properly, but pregnancy was uncomplicated. Infant was delivered at home in unfavorable conditions 2 days before admission. Neonate was admitted due to septic findings, and appropriate treatment was initiated. Echocardiography was performed and revealed secundum-type atrial septal defect without enlargement of any chambers. During procedure, microbubbles were detected in the right-sided chambers of the heart and in the pulmonary artery. Microbubbles were also observed in the hepatic segment of inferior vena cava originating from the ductus venosus, which was still patent, causing portosystemic shunt (Figure 1, Video*). Two days later, no microbubbles were detected in repeat echocardiographic examination.

DISCUSSION

There are 2 possible mechanisms for spontaneous echocardiographic contrast formation. Red cell aggregation is possible cause of spontaneous contrast formation, as are microbubbles. Red cell aggregation is caused by low blood flow state, as seen in Fontan circulation, left ventricular dysfunction, and polycythemia. Blood itself has echogenicity, and this is augmented in previously described conditions. Microbubble formation may develop as result of constrictive pericarditis, gas originating from the gastrointestinal tract, microthrombus, accidental intravenous fluid bubbles, tricuspid valve abnormalities, or right heart failure.[3,4]

Received: June 09, 2016 *Accepted:* July 25, 2016

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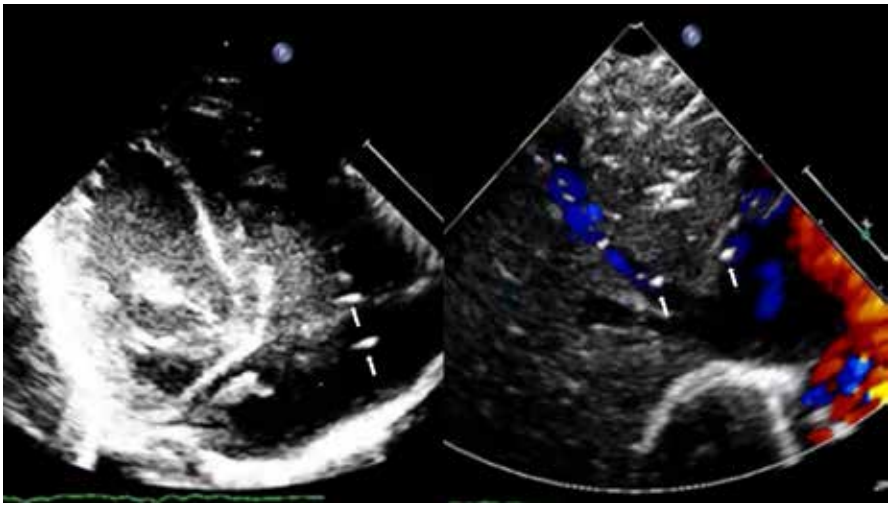

Figure 1. Two-D echocardiography in apical four chamber view demonstrating microbubbles in right chamber of the heart and abdominal view microbubbles originating from ductus venosus passing through inferior vena cava.

The ductus venosus is an embryonic structure connecting the umbilical vein to the inferior vena cava. Functional closure of structure occurs within a few minutes after birth to as late as 37 days after birth.[5] Spontaneous contrast in present neonate was similar to that observed after fluid injection, rather than contrast observed related to stasis of blood flow. Speculated mechanism causing microbubbles is intestinal lipid particles bypassing the liver through portosystemic shunt.[6] Spontaneous contrast disappears either naturally, as in present case, or after occlusion with device, as in another reported case.[6]

Identification of ductus venosus can assist in placement of catheters for interventional cardiac procedures during neonatal period. Patency of structure may be associated with congenital heart disease or pulmonary hypertension, as well as perhaps leading to development of hyperammonemia, encephalopathy, or both, in affected neonates.[7]

Spontaneous echocardiographic contrast imaging in a neonate may lead to unnecessary additional imaging and therapeutic interventions. Visualization of ductus venosus may prevent such interventions, but detecting such a structure requires follow-up to prevent complications associated with portosystemic shunt.

Conflict-of-interest issues regarding the authorship or article: None declared.

****Supplementary video file associated with this article can be found in the online version of the journal.***

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Keywords: Ductus venosus; echocardiographic contrast; neonate.

Anahtar sözcükler: Duktus venozus; ekokardiyografik kontrast; yenidoğan.