

The Role of Real-time Three-dimensional Transesophageal Echocardiography in Patient Selection before Percutaneous Closure of Complex Atrial Septal Defects



Kompleks Atriyal Septal Defektlerin Perkütan Kapatılmasına Uygun Hasta Seçiminde Gerçek Zamanlı Üç Boyutlu Transözafajeal Ekokardiyografinin Rolü

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Atrial septal defect (ASD) is one of the most common forms of congenital heart disease in adults. In addition, morphological variations of ASDs are known to occur very commonly⁽¹⁾. Although percutaneous closure of ASDs has gained more popularity in recent years as a surgical repair technique, morphological evaluation of the defect is necessary for appropriate patient selection⁽²⁾. Traditional balloon-sizing and/or two-dimensional transesophageal echocardiography (2D-TEE) have been used for defect sizing and procedure monitoring. However, these two methods may fail to provide adequate information on the structure of complex ASDs⁽³⁾. Some defects may cross multiple imaging planes, complicating and sometimes precluding accurate visualization by conventional 2D-TEE. Non-visualization, therefore, may result in suboptimal device delivery and unfavorable outcomes. In comparison to 2D-TEE, real-time three-dimensional transesophageal echocardiography (RT3D-TEE) allows an accurate assessment of the cardiac anatomy and excellent spatial orientation, yielding detailed information on the shape and location of the defects⁽⁴⁾. Herein, we present a clinical case where good quality 2D-TEE images failed to reveal the complete anatomy of the interatrial septum, which was readily described by RT3D-TEE. Initially, 2D-TEE showed a typical ostium secundum type ASD with a membranous flap at the left atrial side of the interatrial septum (Figure 1A) and color flow imaging showed a left to right shunt through the interatrial septum (Figure 1B). A subsequent RT3D-TEE revealed the complex nature of the septum, thus providing more exact imaging of the complex ASD. The size and shape of multiple defects separated by two bands of interatrial septum were visualized from different aspects. (Figure 2A and 2B). These anatomical details that could be obtained only with the use of RT3D-TEE facilitated a surgical repair procedure with a patch of autologous pericardium over a percutaneous closure.

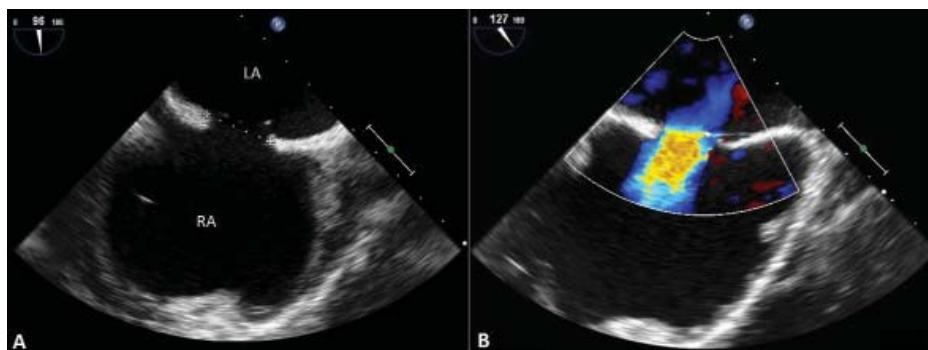


Figure 1. (A) Two-dimensional transesophageal echocardiography showing a typical ostium secundum type ASD with a membranous flap image at the left atrial side (B) and color flow imaging showing a left to right shunt through interatrial septum.

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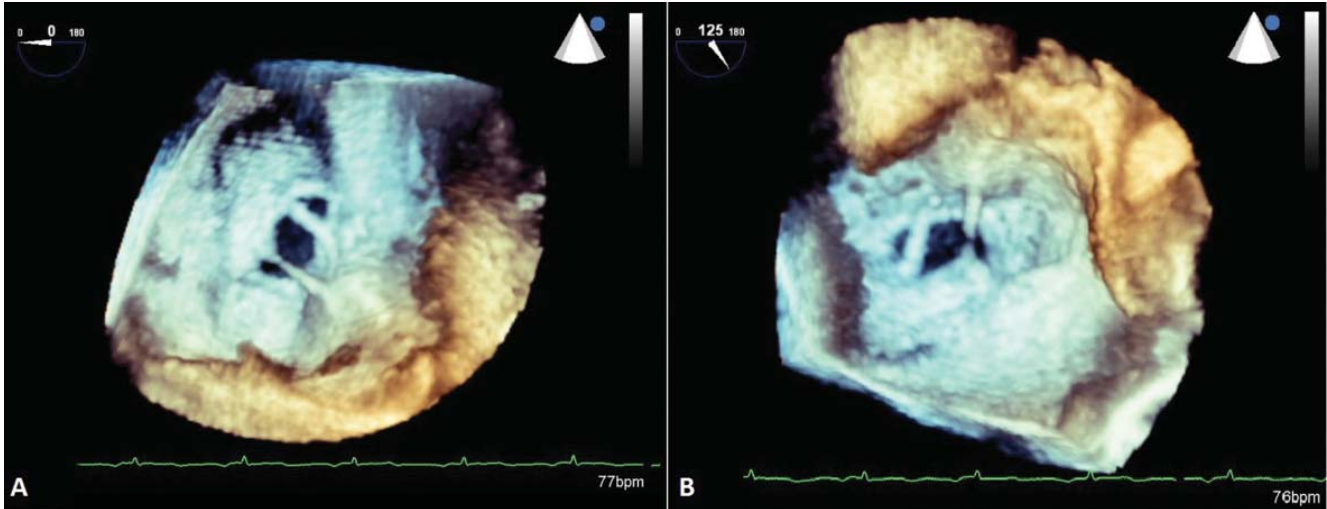


Figure 2. Real-time three-dimensional transesophageal echocardiography showing the complex nature of the septum and providing accurate images of multiple defects separated by two bands of interatrial septum from two different aspects (A and B).

Real-time three-dimensional transesophageal echocardiography is, therefore, a safe and useful technique in patient selection before percutaneous closure of complex ostium secundum ASDs. Clinical outcomes of percutaneous ASD closure may be improved with the use of complementary RT3D TEE imaging.

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