

Accuracy of imaging fusion between echocardiography and fluoroscopy in percutaneous atrial septal defect closure in children

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Introduction:

EchoNavigator® allows imaging fusion between 3D echocardiography and fluoroscopy in the catheterization laboratory. We aim to test the accuracy of the imaging fusion in a pediatric population.

Methods: During percutaneous closure of atrial septal defect in 31 patients (26 kgs [21-37]), occluder devices, visualized on echo and fluoroscopy, were used as a reference tool. A first distance was measured between a marker positioned on echo and the thread pitch on fluoroscopy. A second distance was measured between the thread pitch on the 3D echo view and on fluoroscopy. The 2 distances were measured on 4 orthogonal views in systole and diastole.

Results:

Fusion and marker positioning were feasible in real-time in all cases. In 5 cases (16.1%), fusion was instable during the procedure with transient loss of the automatic tracking of the probe. Quality of the fusion imaging was rated good in all cases. On the fusion view, minimal and maximal first distances during the cardiac cycle were 0.5 [0.3-1] and 2mm [1.5-2.5] ($p < 0.0001$). The marker positioned on echo was fixed and did not follow the movement of the thread pitch. Minimal and maximal second distances were 0.5 [0-0.5] and 2mm [1.5-2.5] ($p < 0.0001$).

Conclusion: Feasibility and accuracy of imaging fusion between echocardiography and fluoroscopy using the EchoNavigator® software is high in children above 20 kgs. This software offers a new real-time imaging guiding modality in the catheterization laboratory with potential interest in complex procedures as well as for fellow training.