Guiding transseptal puncture by 3D-overlay of the Left Atrium and Ascending Aorta by a new Software-Prototype

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Purpose

• Prototype Development
  Merging of 3D-Datasets with 2D biplane fluoroscopic imaging

• Clinical Application
  Pulmonary Vein Isolation in interventional treatment of Atrial Fibrillation

• Transseptal Puncture
  Performed to access Left Atrium (LA). Controlled by TEE, intracardiac ultrasound, pressure

Material & Methods

Visual guidance for transseptal puncture by 3D-overlay in biplane fluoroscopy

3D-Models of important anatomic landmarks (LA, Aorta, Coronary Sinus) are superimposed onto biplane fluoroscopy. 3D-Models are selectively visualized on the basis of a preprocedurally acquired MR-Angiography.

Results

• Integration of the 3D-Model on fluoroscopy was matched by Coronary Sinus Model and placed Coronary Sinus Catheter in 61 left atrial procedures

• Initial Left Atrial position, aligned to CS-catheter before transseptal puncture, was compared to second Left Atrial position based on dye injection after transseptal puncture. Mean difference measured by three-dimensional Euclidean Distance: \( \phi 10,8 \) mm

• All punctures succeeded, pericardial effusions were ruled out by echocardiography, no complications occurred

Conclusions

• The 3D-Overlay of Left Atrium, Coronary Sinus and Aorta on biplane fluoroscopic imaging provides important anatomic landmarks to perform transseptal puncture

• 3D-Fluoroscopy, additionally applied to conventional techniques of transseptal puncture (pressure-control, ultrasound), can increase the safety of the procedure

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