

**Early experience with a novel image fusion software for 3D guidance of complex trans-catheter interventions.**

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**Introduction**

Recent improvements in the development of fusion imaging software have led to the introduction of a 3D roadmap based on preregistered Computed Tomography (CT) or Magnetic Resonance (MR) datasets for live guidance of trans-catheter interventions. Currently there is limited experience available with 3D fusion software, coming predominantly from aortic and peripheral interventions in adults. Despite these limitations the results show promising reduction of contrast and radiation exposure along with shorter procedural times. We describe our initial experience with recently available VesselNavigator (Phillips) for live guidance of trans-catheter interventions in congenital heart defects.

**Methods**

We performed a retrospective review of all trans-catheter interventions guided with VesselNavigator. Patient characteristics and catheterization data were reviewed with focus on segmentation, fusion and intervention guidance.

**Results**

Between November and December 2015, 4 patients underwent trans-catheter interventions with VesselNavigator guidance. The median age was 9.7 years (2 weeks – 14 years) and median weight was 32.5 kg (3.5 – 46 kg). The interventions included stent implantation in aortic coarctation, patent arterial duct and right pulmonary artery and pulmonary valve placement. Existing CT datasets were used to create a 3D roadmap in all patients. The target structures were easily selected with one-click segmentation and additional ring markers were utilized in 3 patients. For registration and fusion of the overlay, fluoroscopy images were acquired in posterior-anterior and lateral projections with spine and vertebrae (4 patients), calcifications (3) or contrast injection (2) serving as reference points for orientation of the 3D roadmap against live fluoroscopy. Accurate overlay was achieved in all patients and enabled successful interventions without additional contrast injections prior to stent placement.

**Conclusions**

In our early experience, VesselNavigator proved to be useful in guidance of versatile complex trans-catheter interventions. Intuitive segmentation and easy fusion with live fluoroscopy allowed shortening of the diagnostic phase of the procedure and reliable 3D roadmap facilitated interventional treatment.