Symposium

Symposium 10 (II-S10)
Novel Simulation Methods in Pediatric Cardiology and Cardiac Surgery: Its Potential and Limitation

Chair:Keiichi Itatani(Department of Cardiovascular Surgery, Kyoto Prefectural University of Medicine, Japan)
Chair:Isao Shiraishi(Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Japan)
Co-host:ANSYS Japan K.K.
Co-host:Siemens Healthcare K.K.
Co-host:Materialise Japan K.K.
Sat. Jul 8, 2017 2:00 PM - 3:30 PM ROOM 7 (Seminar and Exchange Center, 2F The Music Studio Hall)

2:00 PM - 3:30 PM

[II-S10-05]Simulation of Cardiac Surgery and Catheter Intervention using Patient-specific 3D Heart Models: Limitations and Potential through a 3-year Experience

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Keywords:シミュレーション, 3Dプリント, 立体模型

【 Background and Objective】 In 2014, we established simple and inexpensive methods using a personal 3D printer to create patient-specific 3D heart models for planning of surgery and simulation of catheter intervention. We report the limitations and potential of simulation using 3D models through our 3-year experience. 【 Methods】 DICOM data of contrast-enhanced multi-detector CT scan were converted into STL format, and (1) solid ABS resin model was printed using 3D printer. If necessary, (2) transparent silicone hollow model was additionally created using (1) as a mold. All processes were performed at our institution. 【 Results】 The time/cost needed to create (1) and (2) models were 5-24 h/5,000 JPY and 3-7 days/10,000-20,000 JPY, respectively. (1) was helpful in understanding spatial relationship among great vessels and trachea and so on. (2) had good reproducibility for understanding intracardiac structures and was useful in the surgical planning of complex/rare anomalies, even if their vascular wall thicknesses were not very accurate. Although its hardness rendered it unsuitable for training in detailed surgical techniques, (2) was suitable for simulation of occluder deployment for PDA with calcification in adults. X-ray transparency of (2) was appropriate for catheter manipulation because catheter/device was visible from outside, it was useful for training in catheter interventions. 【 Conclusions】 From the viewpoint of fidelity for anatomical accuracy, there were some limitations in these models; however, high-quality simulation becomes possible using these features.