

The new IQoDS score for fluoroscopy imaging revealed impaired visibility for stents and devices with lower metal portion after Allura Clarity update

Mueller G.C. (1), Stute F. (1), Waschkewitz J. (2), Biermann D. (3), Schoen G. (4), Frenzel T. (5), Kozlik-Feldmann R. (1)

University Heart Center Hamburg, Department of Pediatric Cardiology, Hamburg, Germany (1); University Medical Center Hamburg-Eppendorf, Department for Radiotherapy and Radiation Oncology, Hamburg, Germany (2); University Heart Center Hamburg, Department of Pediatric Cardiac Surgery, Hamburg, Germany (3); University Medical Center Hamburg-Eppendorf, Institute of Medical Biometry and Epidemiology, Hamburg, Germany (4); University Medical Center Hamburg-Eppendorf, Ambulatory Center, Department of Radiation Oncology, Hamburg, Germany (5)

Introduction: Concerns over the effect of x-ray radiation on patient and staff during cardiac interventions for congenital heart disease have increased in recent years. A wide range of devices and stents made of different materials are available. The study aims at stent and device visibilities after Allura Clarity update under recommendation of the assessability of implants functional safety.

Methods: To evaluate image quality a new score (Image Quality of Devices and Stents) based on device or stent visibility (visualization of endings, wire configuration, integrity and possible fractures) as well as visibility of leading structures like bones, airways and heart shape was developed. Visibility was categorized in four quality classes from clearly identifiable, to blurredly, unsure and not identifiable (score range:7- 28points). For analysis of implants a subanalysis of device and stents visibility was performed (subscore range 4-16points). All pediatric patients receiving stents or devices from 2014 to 2016 were included and a representative number of 1119 fluoroscopy series were analyzed before (Allura Xper) and 1038 after the upgrade (Allura Clarity). Implants with higher and lower metal portion were separately evaluated. Diagnoses showed a broad spectrum of congenital heart defects. Patient groups were comparable concerning interventions, investigators, patient's age and weight.

Results: Overall image quality measured by IQoDS score was comparable before and after upgrade to Allura Clarity (IQoDs score: 18.11 vs 17.87; $p=0.64$), whereas visibility of stents and devices with lower metal portion revealed significant lower scores after Allura Clarity update (8.74 vs 7.79; $p=0.012$). Imaging of implants with higher metal portion was comparable before and after Allura Clarity update.

Conclusion: Allura Clarity update is without impact on overall image quality. Nevertheless visibility of devices and stents with lower metal portion becomes more difficult.