Purpose: The radiation dose rate and image quality were compared on GE OEC 9900 Elite Vas 8 and Philips Veradius fluoroscopic C-arms.

Methods: Plastic (PMMA) phantoms were used to simulate various thicknesses of soft tissues encountered during fluoroscopically-guided interventional procedures while aluminum and copper phantoms were used to simulate extremities of different sizes. An image quality test tool and an ionization chamber were included in the setup of each phantom. The phantoms were imaged in several fluoroscopy modes and at different dose levels. The entrance surface air KERMA rate (ESAKR) was measured for each phantom in each fluoroscopy mode. Simultaneously, the image quality was assessed by counting the number of low-contrast objects visible in the image quality test tool. For a given phantom type and thickness, the ESAKR was plotted versus the number of visible low-contrast objects to compare the dose rate required for a given level of image quality. Additionally, the mean ESAKR per number of objects was calculated and p-values were used to test for statistically significant differences between the C-arms.

Results: For comparable image quality with a given phantom type and thickness the ESAKR with the OEC was typically much higher than with the Veradius. One-tailed, unpaired t-tests confirm that the mean ESAKR per number of visible low-contrast objects was lower for the Veradius than for the OEC with all thicknesses of PMMA (p < 0.05). The differences for the aluminum and copper phantoms were much smaller and were not statistically significant (p-values ranged from 0.2 to 0.47).

Conclusion: In general, the Veradius C-arm provided better low-contrast image quality during fluoroscopy, with lower ESAKR than the OEC 9900 Elite Vas 8. The differences were statistically significant only with PMMA phantoms.

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