Purpose: To provide improved MAF image guidance during intracranial aneurysm treatment (IAT) with detachable coils.
Method and Materials: The MAF is an ultra-high resolution (35 μm pixels), high speed detector mounted on a clinical Flat Panel (FP) C-arm used whenever high resolution is needed in a small field of view. During IAT's the interventionalists fill the aneurysm dome with platinum or highly x-ray attenuating detachable micro-coils. For medium and large aneurysms, the coil mass becomes increasingly dense making any additional coil nearly impossible to visualize with the standard FP. Thus estimation of dome filling relies heavily only on experience rather than actual imagery. The MAF gain is capable of adjusting dynamically during the procedure based on the average pixel value indicated in a custom or preset ROI. In this study we selected an ROI fitted over the aneurysm, so that as the aneurysm fills with coils, the MAF gain increases to keep the ROI average pixel value the same even with increased x-ray attenuation. The aneurysm was coiled using MAF fluoroscopic guidance for an elastomer aneurysm phantom superimposed on an anthropomorphic head phantom. The technique was repeated for the FP for comparison purposes.
Results: The MAF used with dynamically adjustable gain offered excellent coil visualization during the entire process while the microcatheter tip position and deployment in the aneurysm within the coil mass was visible at all times even though background values increased during deployment to saturation. For the FP, imaging of the catheter tip was not distinguishable after 1/3 coil filling.
Conclusions: Improved image guidance for coil deposition in aneurysms is presented. Catheter tip visualization was possible during the entire process which could result in better aneurysm dome coil filling due to improved image guidance with the MAF.

Funding Support, Disclosures, and Conflict of Interest:

Support: NIH Grants R01-EB008425, R01-EB002873.