Purpose:
To compare the ability of a standard flat panel detector (FPD) with that of the new Microangiographic Fluoroscope (MAF) to visualize individual coils used in minimally invasive (endovascular) treatment of cerebro-vascular aneurysms where high-resolution image guidance may be critical to the accuracy and hence outcome of the intervention.

Methods:
A human neurovascular aneurysm elastomer phantom was filled with standard platinum coils (GDC-10 Coil SR) and placed on an anthropomorphic head phantom to provide a realistic challenge to the two detectors, both of which were mounted on a Toshiba Infinix C-arm gantry. The standard FPD (Varian PaxScan-2020, 194µm pixel-width, 600µm thick CsI) was compared with a custom MAF (35µm pixel-width and 300µm thick CsI-HR type). Using the same x-ray technique parameters for the same projection view, the images from each detector were digitally contrast matched to enable comparisons of important features such as individual coils and unfilled spaces within the coil mass both for overall qualitative detail and for quantitative measures of corresponding profiles across the features.

Results:
The FPD images gave an overall impression of being blurred compared to the MAF images where more individual coils and a clearer demarcation of the spaces between the coils were apparent. The ratio of the average individual coil wire diameter taken from four separate profiles for the FPD to that for the MAF was 1.22, indicating a substantial improvement in detail visualization for the MAF.

Conclusions:
Standard FPDs have difficulty separating coil wires and visualizing through dense aneurysm coil masses whereas the MAF with its large adjustable dynamic gain and high spatial resolution provides improved visualization and should be able to provide superior image guidance during delicate neurovascular interventions.

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