Multispectral fluorescence imaging

Digital subtraction angiography (DSA) is the gold standard for vascular imaging, but is not easily integrated into a continuous microsurgical environment. Other available modalities for intraoperative vascular assessment have their own limitations. OBJECTIVE:

To investigate multispectral fluorescence (MFL), a new technology based on indocyanine green (ICG) fluorescence, which may provide advantages over current intraoperative imaging modalities. METHODS:

Cadaveric intracranial aneurysm models and turkey wing bypasses were created and tested with white light and micro-Doppler ultrasound, indocyanine green videoangiography (ICG-VA), MFL, and DSA in conditions mimicking surgery. Assessments with these modalities were scored by 7 neurosurgeons. RESULTS:

DSA was significantly better than other modalities in evaluating the vasculature (P < .0001), but was significantly less ergonomic and efficient (P < .0001). MFL and ICG-VA were not significantly different from each other. Both were significantly better than white light/micro-Doppler ultrasound in assessing occlusion and patency (P \leq .011), and both were better than DSA in ergonomics and efficiency (P < .0001). CONCLUSION:

MFL performs similarly to ICG-VA in a laboratory setting. Further study will be required to determine whether it compares favorably in the operating room. While DSA is the standard for cerebrovascular visualization, MFL and ICG are significantly more ergonomic and efficient ¹⁾.

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Nickele C, Nguyen V, Fisher W, Couldwell W, Aboud E, David C, Morcos J, Charalampaki C, Arthur A. A Pilot Comparison of Multispectral Fluorescence to Indocyanine Green Videoangiography and Other Modalities for Intraoperative Assessment in Vascular Neurosurgery. Oper Neurosurg (Hagerstown). 2018 Oct 5. doi: 10.1093/ons/opy237. [Epub ahead of print] PubMed PMID: 30295894.

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