Ultrafast Doppler Ultrasound

Ultrafast ultrasound Doppler imaging offers a new and advantageous intraoperative method for brain lesions. Compared to the conventional color Doppler ultrasound system, the ultrafast Doppler allows us to image hemodynamics in small vasculature in an unprecedented high spatio-temporal resolution without using contrast agent. This report presents an intraoperative ultrafast ultrasound Doppler image of a 53-year-old male with a language eloquent area brain arteriovenous malformation (BAVM). The advanced ultrafast Doppler method provides the nidus vasculature hemodynamics with a spatial resolution of 300 µm at thousands of framerates per second. The image also demonstrates that no abnormal vessels infiltrated the eloquent gyrus as the piamatral small vessels outlined the intact boundary. Successful removal of the nidus with full language function preservation highlights the potentials of ultrafast Doppler imaging to improve diagnostic capabilities and surgical outcomes for patients with intracranial lesions [1)].

1)
Xu K, Yan S, Song J. Ultrafast Doppler Imaging of Brain Arteriovenous Malformation. World Neurosurg. 2023 May 28:S1878-8750(23)00721-0. doi: 10.1016/j.wneu.2023.05.088. Epub ahead of print. PMID: 37253407.