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The study of diagnostic ultrasound associated with microbubbles to open the blood brain barrier of rat

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T o explore the safety and effectiveness of diagnostic ultrasound associated with microbubbles to open the blood brain barrier (BBB). Microbubbles were injected through caudal vein, the rat head was radiated by GE Vivid 7 diagnostic ultrasound immediately. The radiated depth was located in the basal ganglia assisted by magnetic resonance imaging (MRI) scanning. The degree of BBB opening was evaluated by enhanced MRI and Evans blue dyeing. The safety was inspected by observation of cell morphology under hematoxylin eosin (HE) staining.

Results: The rat head was radiated by diagnostic ultrasound with microbubbles, signal enhancement of the radiated area was observed on post contrast T1-Weighted images. Red fluorescence of Evans blue was detected by fluorescence microscope in the same area. Normal cellular morphology and structural integrity were showed by HE staining.

Conclusion: The BBB of rat could be opened targetedly and noninvasively by diagnostic ultrasound associated with microbubbles. This may provide a new strategy for the drugs and stem cells treatment in the central nervous system diseases.

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