

Figure S1 The acoustic field characterization of the custom-built transducer in water. (A) 2D acoustic power distribution in the focal XY plane. (B,C) The acoustic power distribution along the X axis and Y axis when the amplifier was driven by 300 mVpp input. (D) Negative acoustic pressure measured by a hydrophone at different input voltages of the amplifier. (E) 3 dB contour line of acoustic power intensity in the focal XZ plane, the length on the Z axis is 32 mm.

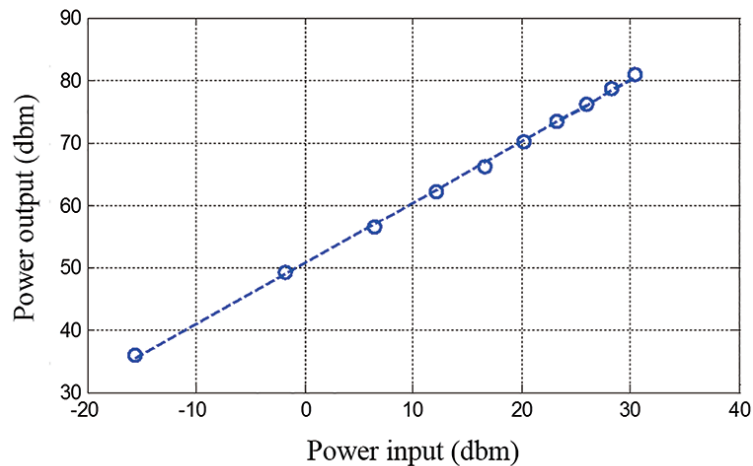


Figure S2 The gain of the custom-built power amplifier was measured as ~50 dB operating at 300 kHz.

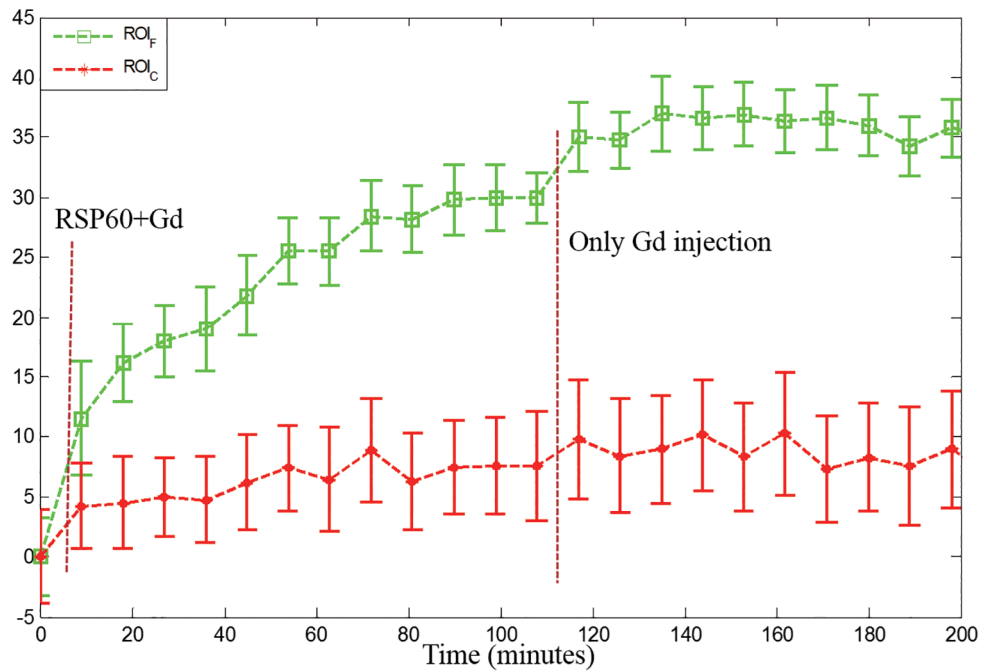


Figure S3 To verify whether the BBB was closed 100 minutes after RSP60 sonication, Gd was injected again 100 minutes after RSP60. The signal intensity in ROI_F continued to increase after the second contrast injection even without ultrasound, while the intensity in ROI_C was almost the same. This observation indicates that the BBB was not closed 100 minutes after RSP60.

Table S1 The relative signal enhancement (%) in the experimental groups

Group		G1	G2	G3	G4		G5	
Protocol		RaSP30	RaSP60	LP10	RaSP30	RaSP60	RaSP30	LP10
M21	ROI _F	12.7±3.0	29.6±3.0	45.7±4.0	13.2±3.3	32.5±2.9	13.3±3.2	47.2±2.5
	ROI _C	6.4±3.7	8.9±4.0	10.0±2.6	4.6±3.2	8.1±3.3	5.9±4.3	8.6±3.5
	Diff	6.3	21.6	35.7	8.6	24.4	7.4	38.6
M22	ROI _F	13.8±3.8	23.7±6.7	33±6.6	13.1±3.7	25.1±4.4	12.6±3.3	37.6±3.8
	ROI _C	4.5±3.8	5.5±6.7	6.9±4.5	3.0±3.5	7.6±3.5	7.5±6.2	8.7±5.8
	Diff	9.3	18.2	26.1	10.1	18.5	5.1	28.9

ROI_F: region of interest at focus. ROI_C: region of interest at the opposite hemisphere for comparison. Diff: the difference between relative signal enhancement of ROI_F and ROI_C.