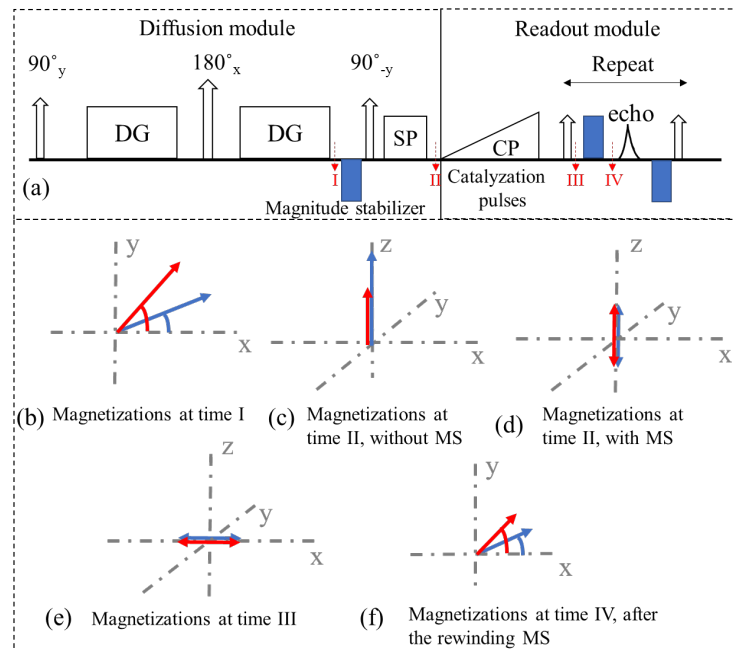


Introduction

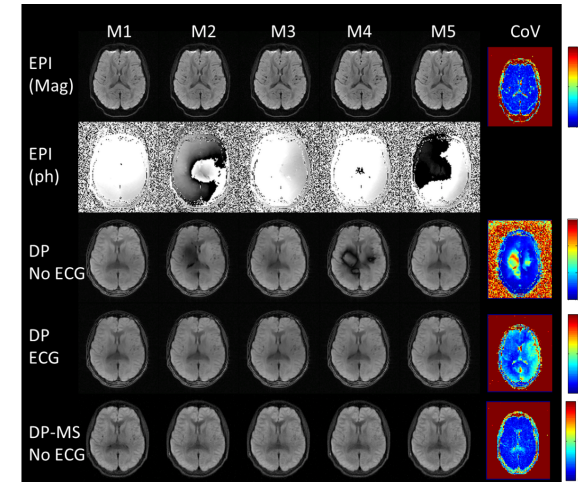
- Multi-shot diffusion technique provided higher resolution and reduced distortion, whereas suffers from shot to shot k-space inconsistency.
- Several techniques have been proposed to resolve the phase inconsistency. However, none is applicable to magnitude inconsistency problem in diffusion prepared approach.
- A novel diffusion-prepared magnitude-stabilized bSSFP sequence (DP-MS-bSSFP) was proposed to achieve high quality multi-shot diffusion imaging

Methods

- One magnitude stabilizer gradient (MS) was inserted before the tip-up pulse to evenly disperse the magnetization in the transversal plane. Rephrasing and dephasing MS are inserted before and after the echo during each readout to recall the echo and disperse the magnetization.
- The magnitude stabilizer approach converts the k-space magnitude inconsistency back to phase inconsistency in diffusion-prepared acquisition at the cost of half of the signal loss.

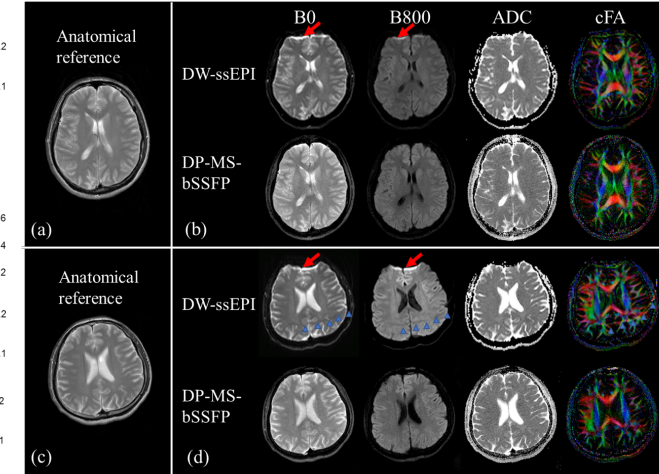


Results



Repeated single-shot study.

Artifacts were strong in DP-bSSFP without ECG triggering. Adding ECG triggering could mitigate the artifacts but still had elevated CoV. No signal variation was observed in DP-MS-bSSFP



Multi-shot results from two volunteers.

Distortion and chemical shift artifacts were apparent in DW-ssEPI images. The DP-MS-bSSFP approach provided high-quality diffusion image, ADC map and cFA map.

Discussion

- The proposed approach provided high-quality diffusion images without observable distortion or image artifacts.
- The magnitude stabilizer strategy is comparable with many types of readout, enabling the flexibility of optimizing image acquisition type, SNR, contrast, and resolution.