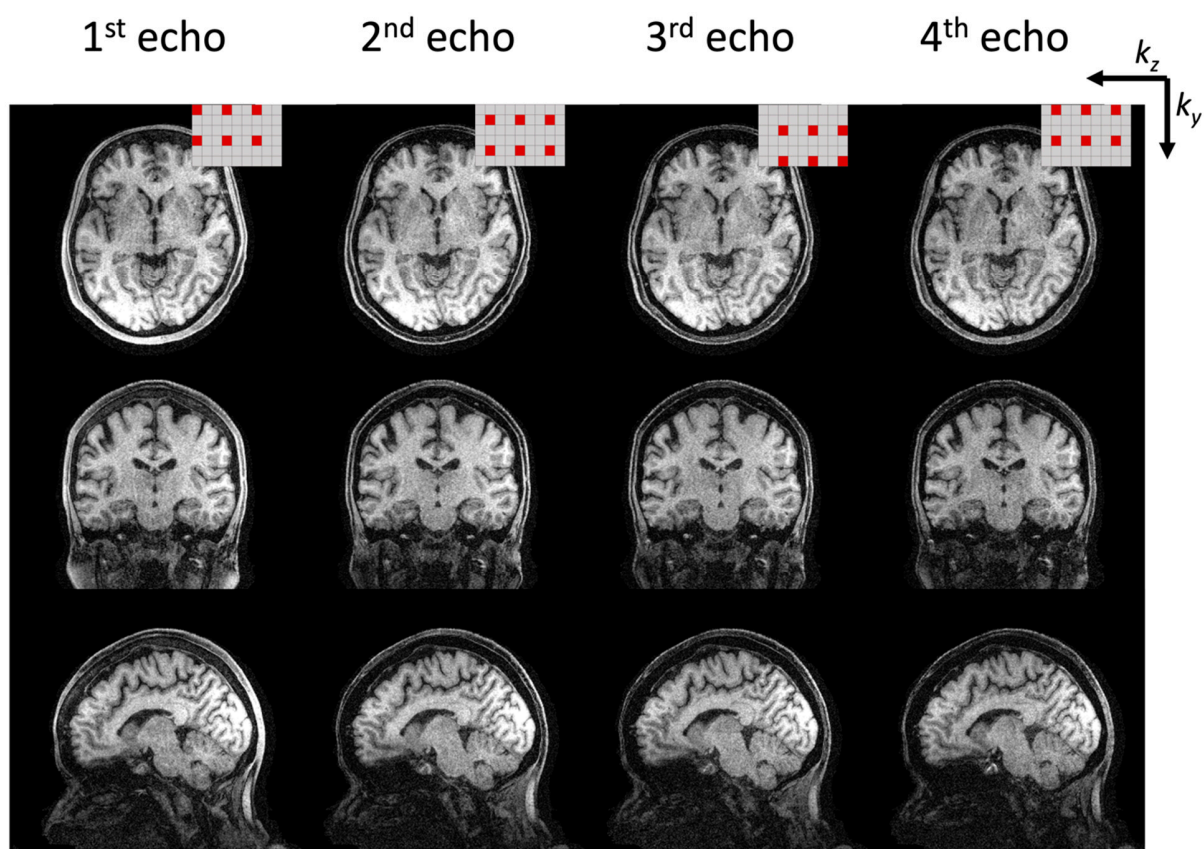


## Supplementary Information



**Figure S1.** Each echo images of wave-MoDL at R=3x3-fold acceleration.

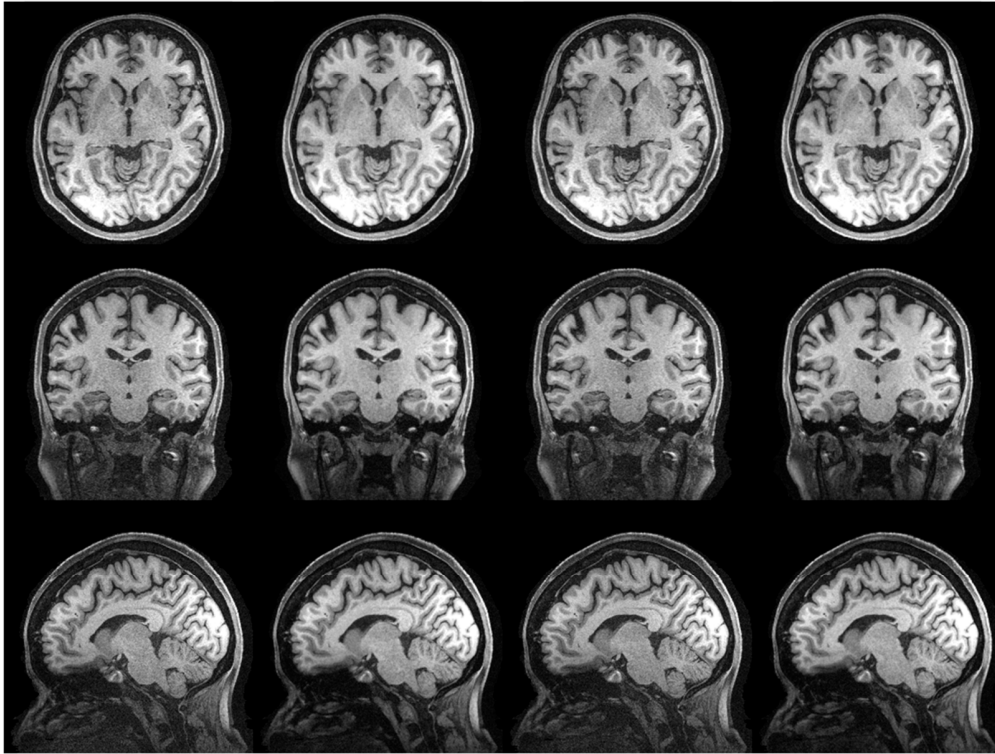
## 2:15-minute MEMPRAGE @ 0.8mm, R3x2

SENSE

MoDL

Wave-CAIPI

Wave-MoDL



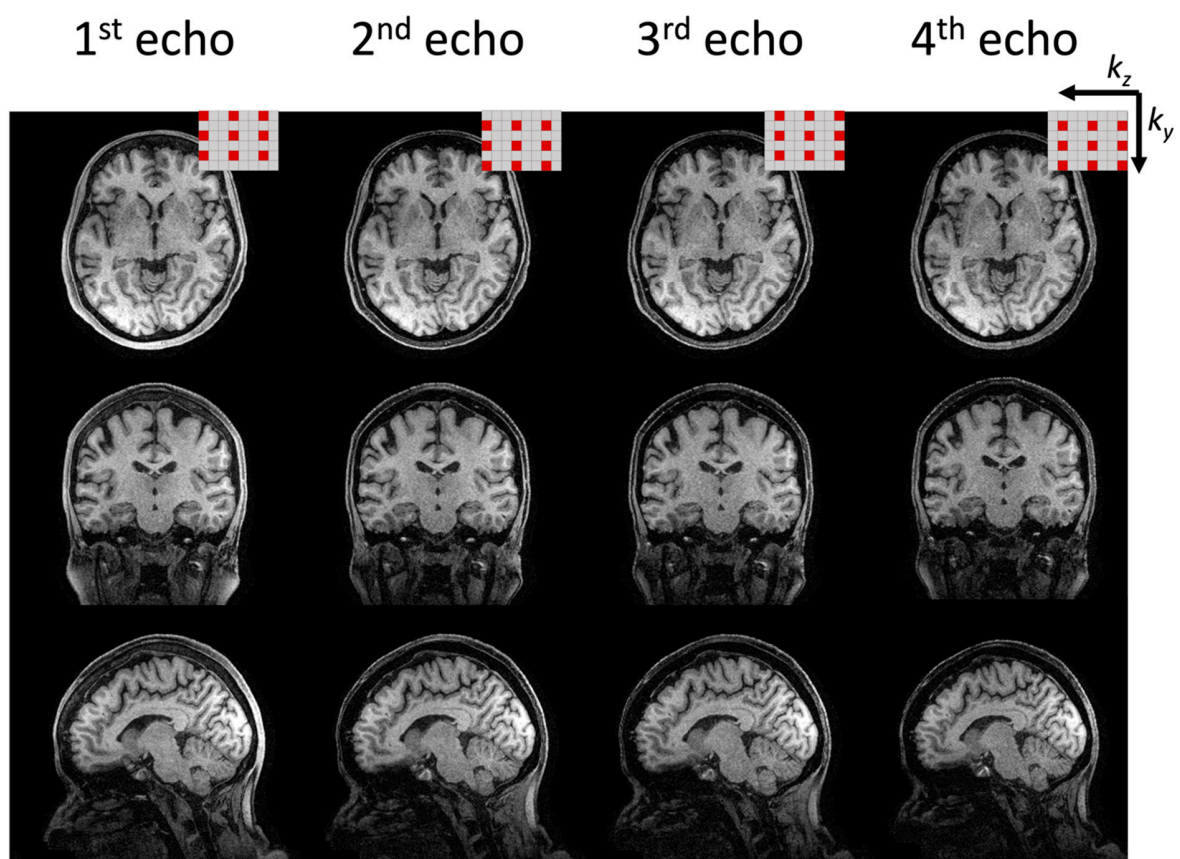
NRMSE : 11.91 %

8.42 %

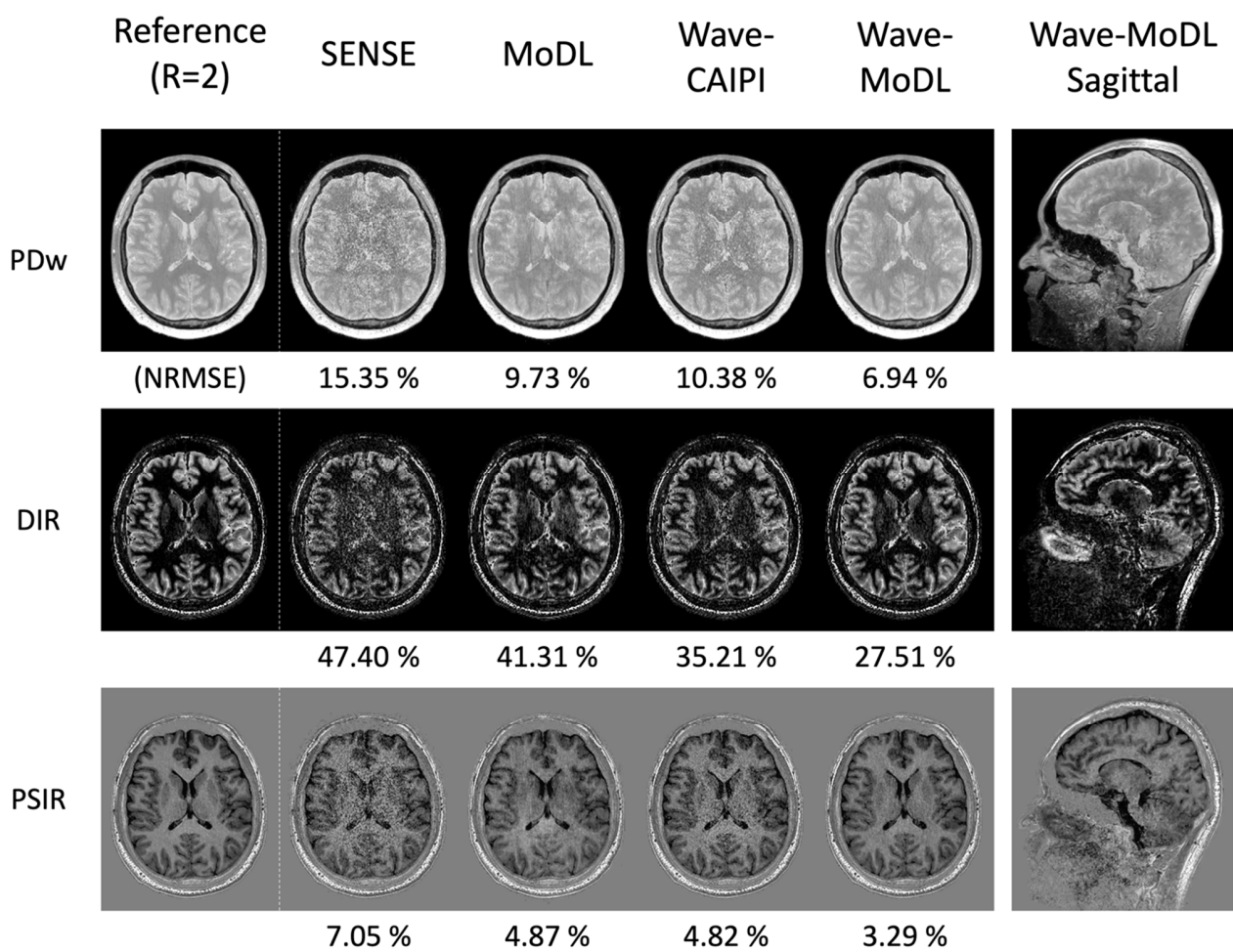
9.40 %

7.58 %

**Figure S2.** The proposed method on the MEMPRAGE database at R=3x2-fold and 0.8 mm isotropic voxel resolution. Echo images were combined with root mean squared. NRMSEs were calculated for the entire testing database.



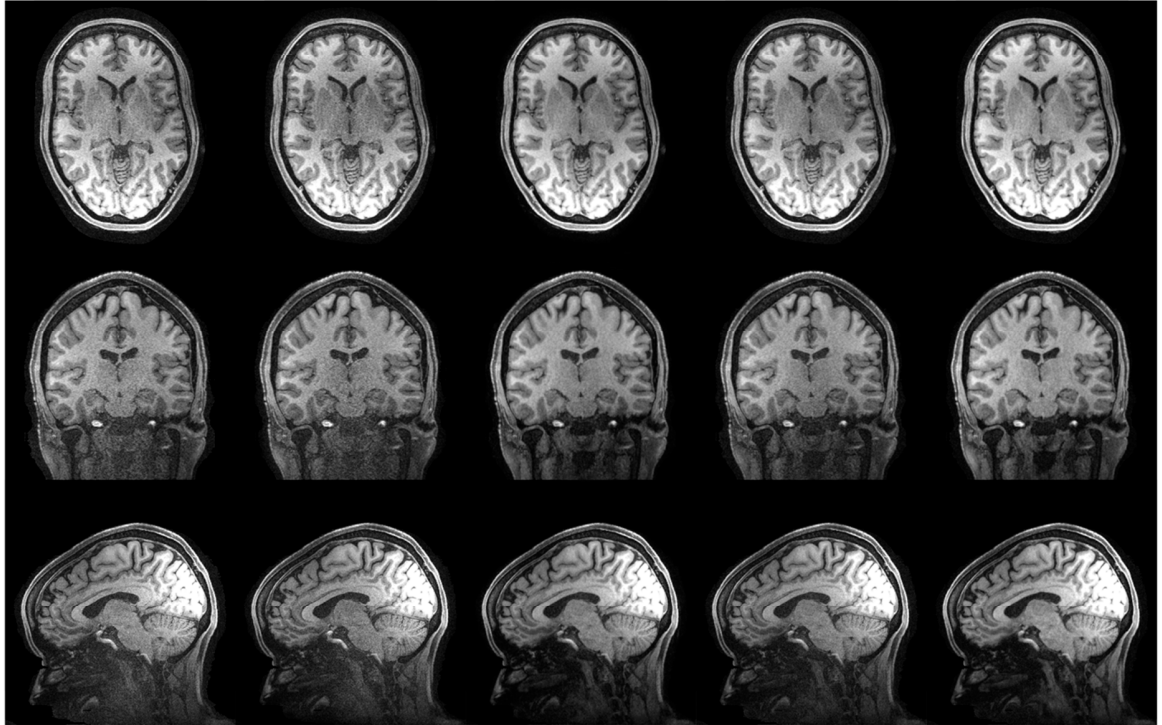
**Figure S3.** Each echo image of wave-MoDL at R=3x2-fold acceleration.



**Figure S4.** The synthesized double inversion recovery (DIR), and phase-sensitive inversion recovery (PSIR) images at R=4x3-fold acceleration.

## 1:30-minute MEMPRAGE @ 0.8mm, R3x3

Wave-CAIPI   Wave-LORAKS   U-net  
denoiser (1)   U-net  
denoiser (2)   Wave-MoDL



NRMSE :	16.41 %	13.44 %	9.86 %	11.19 %	11.18 %
SSIM :	0.8453	0.8683	0.7682	0.8235	0.9104
# params :	-	-	34,618,090	105,115	91,458

**Figure S5.** Wave-CAIPI, wave-LORAKS, U-net denoisers, and wave-MoDL on the MEMPRAGE database at R=3x3-fold and 0.8 mm isotropic voxel resolution. Echo images were combined with root mean squared. NRMSEs and SSIMs were calculated for the entire testing database.