ONLINE SUPPLEMENTAL DATA

Table S1. Sequences technical parameters summary

Parameter	**3D-TSE "SPACE"**	**3D-IR-GRE "MPRAGE"**	**3D-GRE "VIBE"**
TR (ms)	600	2060	9.00
TE (ms)	11.0	3.66	3.69
TI (ms)	N/A	1040	N/A
Fat suppression technique	Spectral Attenuated Inversion Recovery	Water excitation	Q-fat saturation
Flip angle (deg)	variable	9	12.0
FOV (mm)	256	256	230
In-plane matrix	256 (read) x 256 (phase)	256 (read) x 256 (phase)	230 (read) x 180 (phase)
Slab thickness (mm)	160	160	160
Slice thickness (mm)	1	1	1
Parallel imaging factor ("GRAPPA")	4x	3x	3x
Acquisition plane	Sagittal	Sagittal	Sagittal
Scan time (min:s)	3':10''	3':46''	1':57''

Abbreviations: TR=repetition time; TE=echo time; TI=inversion time; FOV=field of view; N/A= not applicable; GRAPPA = GeneRalized Autocalibrating Partial Parallel Acquisition.

Table S2. Confusion matrix by sequence for all readers averaged (N = 232 subjects x 3 readers = 696 rates).

		Consensus	
		+	-
SPACE	+	48	71
	-	15	562
MPRAGE	+	44	19
	-	19	614
VIBE	+	42	26
	-	21	607

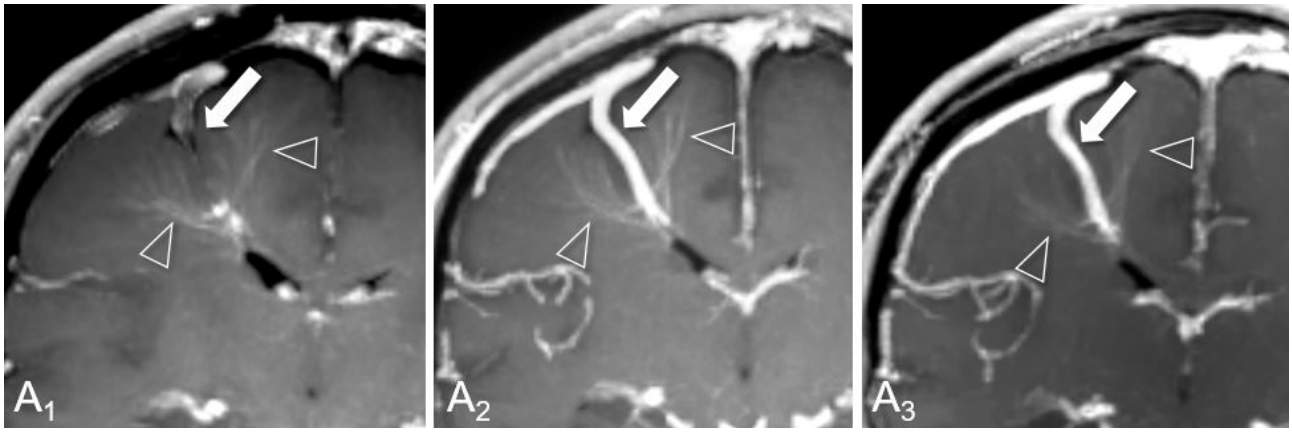

Figure S1. Maximum intensity projected images of SPACE (A_1), MPRAGE (A_2) and VIBE (A_3) images, showing a large developmental venous anomaly (DVA). Despite "black-blood" characteristics, SPACE fails to suppress the signal coming from the slow-flow «caput medusae» tiny veins (arrowheads). However, signal from the large venous collector is suppressed due to flow-void on SPACE, in contrast to MPRAGE and VIBE images (arrows).

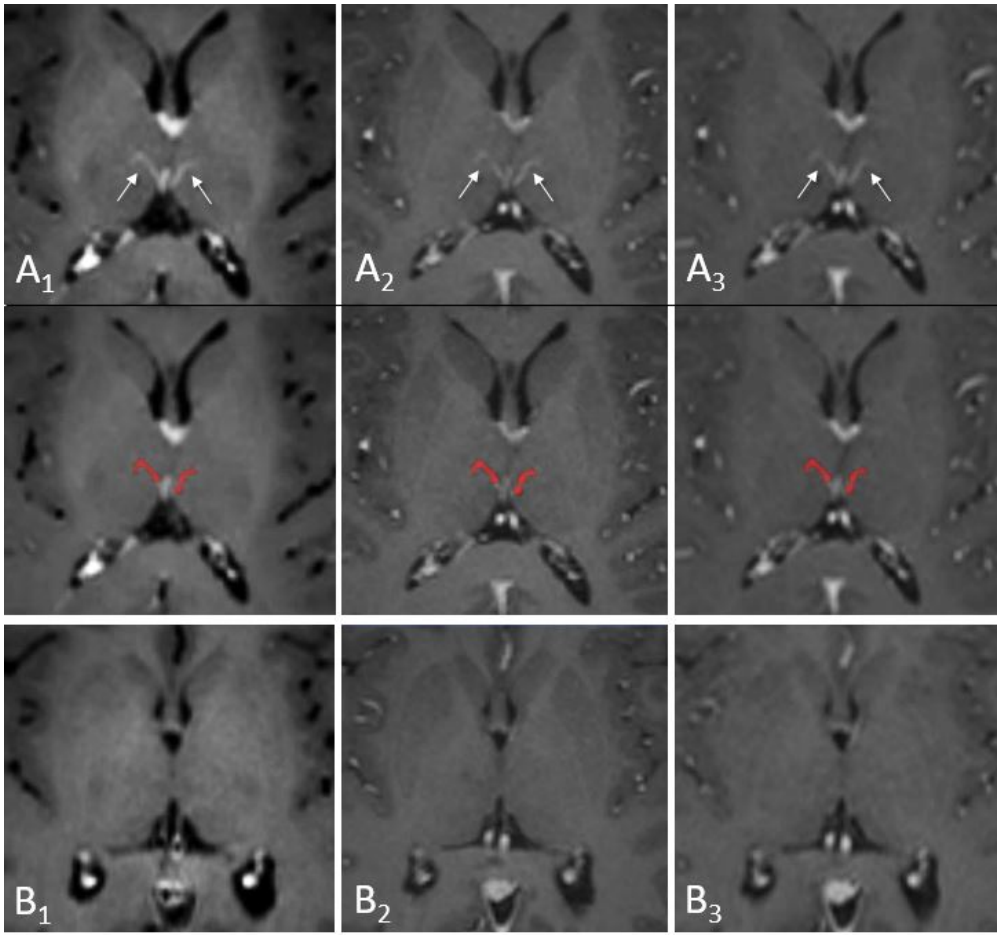

Figure S2. Examples of brain intraparenchymal veins (iV) segmentation at the level of the thalami. A1, A2 and A3 images show iV appearance (upper, small arrows) on SPACE, MPRAGE and VIBE images, respectively. A VOI is obtained by manually drawing all clearly visible portions of the iV in any sequence (lower row, red overlays). The same VOI is applied to all sequences to extract the mean and standard deviation of image signal. In another exemplary case (B1, B2 and B3), iV cannot be detected in any sequence.

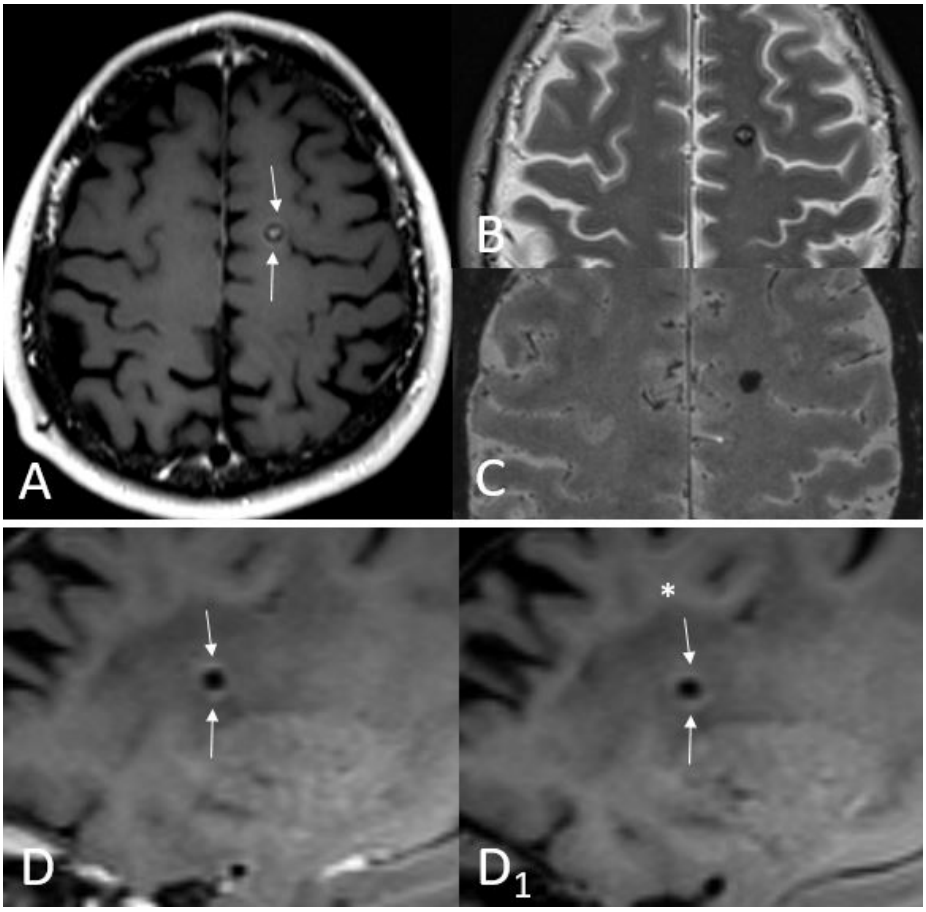

Figure S3. Illustrative cases of sFP (spontaneous hyperintensity on unenhanced T1-weighted images) and uFP (other/undetermined) findings. A. A focal hyperintensity in the left frontal gyrus subcortical white matter is seen on the SPACE image (arrows). The corresponding T2-TSE (B) and SWI (C) images demonstrate hypointensity with blooming effect, indicating a cavernous malformation. This sFP was recorded by all ER and BR on SPACE images. D. The arrows point a rim of relative hyperintensity with respect to the hypointense confluent lesions in the background, and to the lesion core on post-contrast SPACE image. This finding presents an identical appearance on the corresponding pre-contrast image (arrows in D1) and a similar signal intensity to the normal appearing white matter (*), indicating absence of contrast enhancement, and reflecting an illusory visual effect. This uFP was recorded by the BR only.

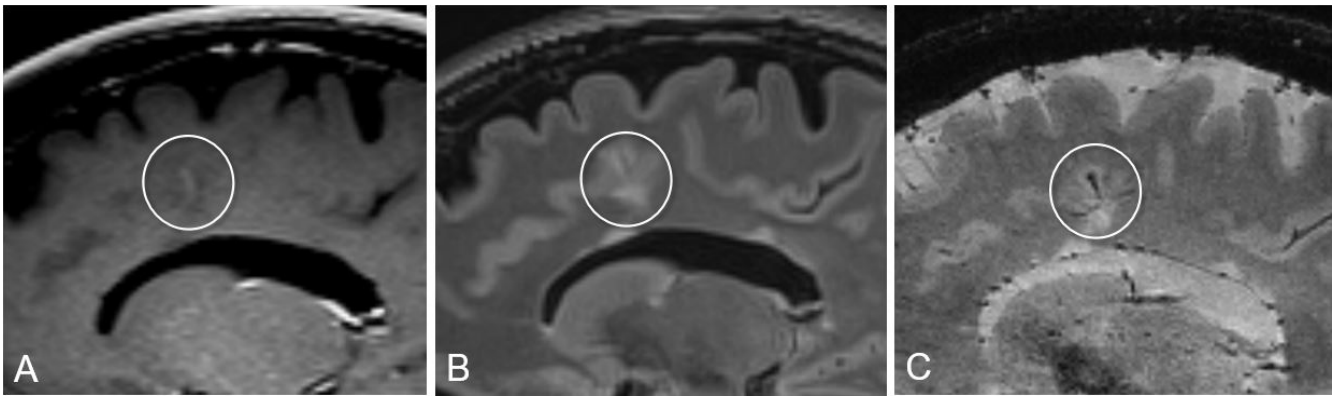

Figure S4. Beginner reader vFP (circle in A – sagittal SPACE image), related to a small DVA sitting in a T2-visible lesion (circle in B). Please note that the characteristic «branched» appearance of the DVA (which is well demonstrated by the corresponding post-contrast SWI in C) is only partially represented by SPACE, probably contributing to the reader confusion.