

On-line Table 1: SNR and CNR of the different (precontrast-only) scan variants^a

	TIWI VISTA (Variant 1)	PD _w VISTA (Variant 2) ^f	TIWI VIRT (Variant 3) ^g	TIWI VIRT (Variant 4)	TIWI VISTA (Variant 5) ^h	TIWI VISTA (Variant 6)	TIWI VIRT (Variant 7)
SNR _{tissue} ^b	15.8 ± 0.9	31.8 ± 2.5	27.9 ± 1.8	43.4 ± 3.4	25.5 ± 2.2	21.2 ± 1.6	45.3 ± 3.6
SNR _{carotid vessel wall} ^c	8.2 ± 0.4	21 ± 1.8	14 ± 0.5	27.3 ± 2.1	16.1 ± 1.8	10.4 ± 0.4	21.4 ± 2.8
SNR _{basilar vessel wall}	6.1 ± 0.6	15.3 ± 2.9	11 ± 1.9	21.2 ± 5.9	11.8 ± 1.9	7.9 ± 0.7	15.2 ± 2.8
SNR _{suprasellar CSF}	6.9 ± 0.5	17.8 ± 3.2	12.2 ± 0.8	24.3 ± 1.1	13.8 ± 0.9	8.7 ± 1.0	16.6 ± 2.1
SNR _{pontine CSF}	2.5 ± 0.4	10 ± 3.9	5.9 ± 1.9	12.8 ± 5.4	7.7 ± 2.7	3.7 ± 1.1	10.8 ± 2.6
SNR _{blood}	2.5 ± 0.2	4.4 ± 0.8	3.4 ± 0.4	4.2 ± 1.1	3.3 ± 0.8	2.5 ± 0.7	4.7 ± 1.1
CNR _{carotid vessel wall–CSF} ^d	1.3 ± 0.6	3.2 ± 2.3	1.8 ± 0.4	3.0 ± 1.9	2.2 ± 1.1	1.7 ± 1.2	4.8 ± 1.5
CNR _{basilar vessel wall–CSF} ^e	3.6 ± 0.4	5.3 ± 1.7	5.1 ± 2.0	8.4 ± 3.9	5.2 ± 0.9	4.1 ± 1.5	4.4 ± 1.6
CNR _{carotid vessel wall–blood} ^c	5.7 ± 0.4	16.6 ± 0.9	10.6 ± 0.8	23.1 ± 2.7	12.7 ± 1.5	8 ± 0.9	16.7 ± 2.5

^a Data are mean and SD calculated in 5 subjects (precontrast).

^b Tissue ROI is located at the left orbital gyri.

^c The mean of the left and right distal intracranial internal carotid arteries.

^d Suprasellar CSF is used as a reference.

^e Pontine CSF is used as a reference.

^f Adjusted from Qiao et al.¹⁹

^g Currently used in our clinic.

^h Adjusted from Qiao et al.¹⁹ with a shorter TR.

On-line Table 2: SNRs and CNRs of the pre- and postcontrast scan variants 3 and 7 with the remaining comparisons^a

	Precontrast		Postcontrast		P Value ^g (Pre 3–Post 3)	P Value ^g (Pre 7–Post 7)	P Value ^h Any Combination
	TIWI VIRT (Variant 3) ^f	TIWI VIRT (Variant 7)	TIWI VIRT (Variant 3) ^f	TIWI VIRT (Variant 7)			
SNR _{tissue} ^b	28.0 ± 1.8	40.5 ± 3.4	27.9 ± 1.3	42.4 ± 2.8	.721	.047	.000 ⁱ
SNR _{carotid vessel wall} ^c	15.3 ± 1.4	20.8 ± 2.7	17.2 ± 0.9	26.4 ± 4.0	.009	.005 ⁱ	.000 ⁱ
SNR _{basilar vessel wall}	13.0 ± 1.4	15.9 ± 1.7	13.4 ± 2.4	19.2 ± 1.8	.241	.017	.000 ⁱ
SNR _{suprasellar CSF}	9.1 ± 2.0	11.9 ± 2.2	11.3 ± 0.7	14.1 ± 2.4	.005 ⁱ	.047	.000 ⁱ
SNR _{pontine CSF}	5.9 ± 2.1	8.0 ± 2.0	6.5 ± 1.8	11.2 ± 2.6	.114	.009	.000 ⁱ
SNR _{blood}	3.6 ± 0.6	5.4 ± 1.2	3.8 ± 0.5	6.3 ± 1.4	.508	.047	.000 ⁱ
SNR _{pituitary gland}	23.0 ± 3.4	33.4 ± 4.7	33.3 ± 3.5	49.5 ± 6.7	.005 ⁱ	.005 ⁱ	.000 ⁱ
CNR _{carotid vessel wall–CSF} ^d	6.1 ± 1.6	9.0 ± 1.5	6.0 ± 0.7	12.3 ± 3.6	.799	.013	.000 ⁱ
CNR _{basilar vessel wall–CSF} ^e	7.2 ± 1.4	7.9 ± 1.4	7.0 ± 2.0	8.0 ± 1.9	.878	.878	.279
CNR _{carotid vessel wall–blood} ^c	11.6 ± 1.3	15.5 ± 2.9	13.5 ± 1.0	20.1 ± 3.8	.005 ⁱ	.007 ⁱ	.000 ⁱ

^a Data are mean and SD calculated in 10 subjects.

^b Tissue ROI is located at the left orbital gyri.

^c The mean of the left and right distal intracranial internal carotid arteries.

^d Suprasellar CSF is used as reference.

^e Pontine CSF is used as reference.

^f Currently used in our clinic.

^g Post hoc analyses were performed using a Wilcoxon signed rank test with a Bonferroni correction applied to determine the specific differences among the variants.

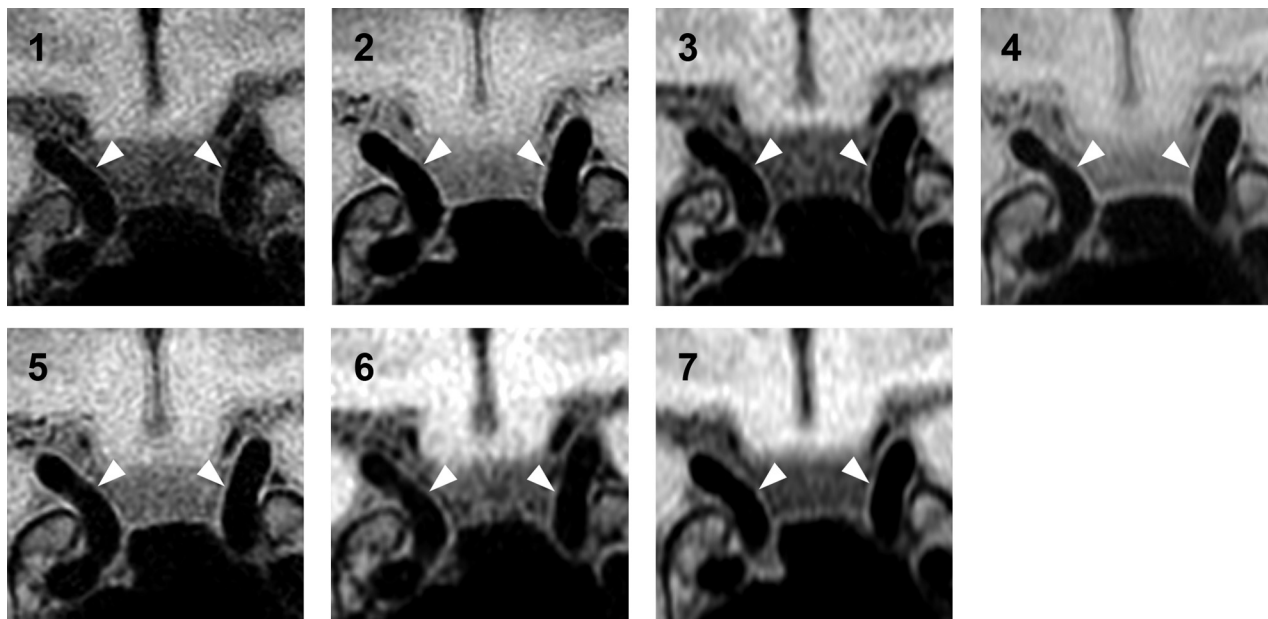
^h A Friedman test was conducted to test for differences across the multiple vessel wall images.

ⁱ Statistically significant ($P < .008$).

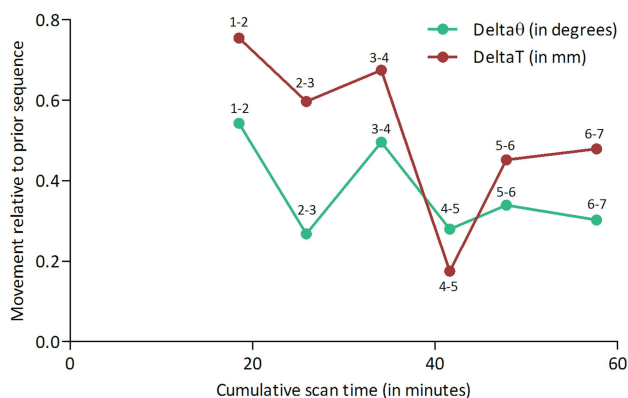
On-line Table 3: All detected vessel wall lesions in the 10 subjects

Vessel Wall Segment	Proximal or Distal	Concentric or Eccentric	Contrast Enhancement
Subject 1			
Left vertebral artery	P	C	+
Left vertebral artery	D	E	+
Right vertebral artery	P	C	+
Basilar artery	P	E	+
Basilar artery	D	E	—
Left PCA (P1 segment)	—	C	—
Subject 2			
Right ICA	D	C	—
Left vertebral artery	D	E	+
Right vertebral artery	D	E	—
Subject 3			
Left vertebral artery	P	C	+
Right vertebral artery	P	C	+
Basilar artery	P	E	—
Subject 4			
Left ICA	D	C	—
Left vertebral artery	P	C	+
Right vertebral artery	P/D	C	—
Subject 5	—	—	
Subject 6	—	—	
Subject 7	—	—	
Subject 8	—	—	
Subject 9			
Left vertebral artery	P	C	+
Subject 10			
Left ICA	P/D	C	+
Left MCA (M1 segment)	P/D	C	+
Left MCA (M2 segment)	P	C	+

Note:—C indicates concentric; E, eccentric; D, distal; P, proximal; PCA, posterior cerebral artery; —, no lesions detected.



ON-LINE FIG 1. Sample images in the coronal plane of the 7 different scan variants performed at 3T (precontrast, in the order of decreasing scan duration). Both distal intracranial internal carotid arteries (*white arrowheads*) are depicted in all images, surrounded by CSF and brain parenchyma. 1, T1WI VISTA variant 1 (8:24 minutes). 2, Proton density-weighted VISTA variant 2 (7:50 minutes), adjusted from Qiao et al.¹⁹ 3, T1WI VISTA variant 3 (6:42 minutes). 4, T1WI VISTA variant 4 (6:01 minutes). 5, T1WI VISTA variant 5 (5:52 minutes), adjusted from Qiao et al.¹⁹ with a shorter TR. 6, T1WI VISTA variant 6 (5:49 minutes). 7, T1WI VISTA variant 7 (4:39 minutes).



ON-LINE FIG 2. The degree of movement during the acquisition time expressed as Δ Rotation (in degrees) and Δ Translation (in millimeters) among all consecutively acquired vessel wall sequences. Each vessel wall sequence is compared with the prior acquired sequence according to the scan protocol (consecutively, variants 2, 5, 3, 4, 7, 1, and 6; Table 1). The mean registration parameters are calculated for 5 subjects. The Δ Rotation and Δ Translation parameters were calculated as $\sqrt{(X\text{-axis}^2 + Y\text{-axis}^2 + Z\text{-axis}^2)}$. Across time, there was no increase in motion in the later scheduled sequences.