

On-line Table 1: Scan parameters of our 7T MRI sequences

Parameter	T1-TFE	PD-SE	T2-TSE	T2*-TFE
FOV (mm)	110 × 110 × 34	120 × 40 × 1	120 × 40 × 1	120 × 40 × 1
Acq. Res. (mm)	0.11 × 0.11 × 0.11	0.11 × 0.11 × 1	0.11 × 0.11 × 1	0.11 × 0.11 × 1
TR/TI/TE (ms)	55/NA/6.0	3500/1100/12	3500/1100/51	3500/1100/15
Imaging matrix	1000 × 1000	1092 × 363	1092 × 357	1092 × 363
Flip angle	25°	90°	90°	90°
TSE/TFE factor	1000	NA	7	1
NSA	1	2	22	3
T (hr:min:sec)	3:39:22	0:42:28	1:05:34	1:03:29

Note:—Acq. Res. indicates acquired resolution; NSA, number of signal averages; T, time (duration); TFE, turbo field echo factor (the number of excitation pulses per inversion [T2], or between frequency drift corrections/adjustments [T1-TFE]); SE, spin-echo; TSE, turbo spin-echo factor (the number of echoes [lines in *k*-space] per excitation). An inversion time was used to null the gel signal; NA, not applicable.

On-line Table 2: Overview of image contrast heterogeneity within the vessel wall on 7T MRI and its correlation with histology

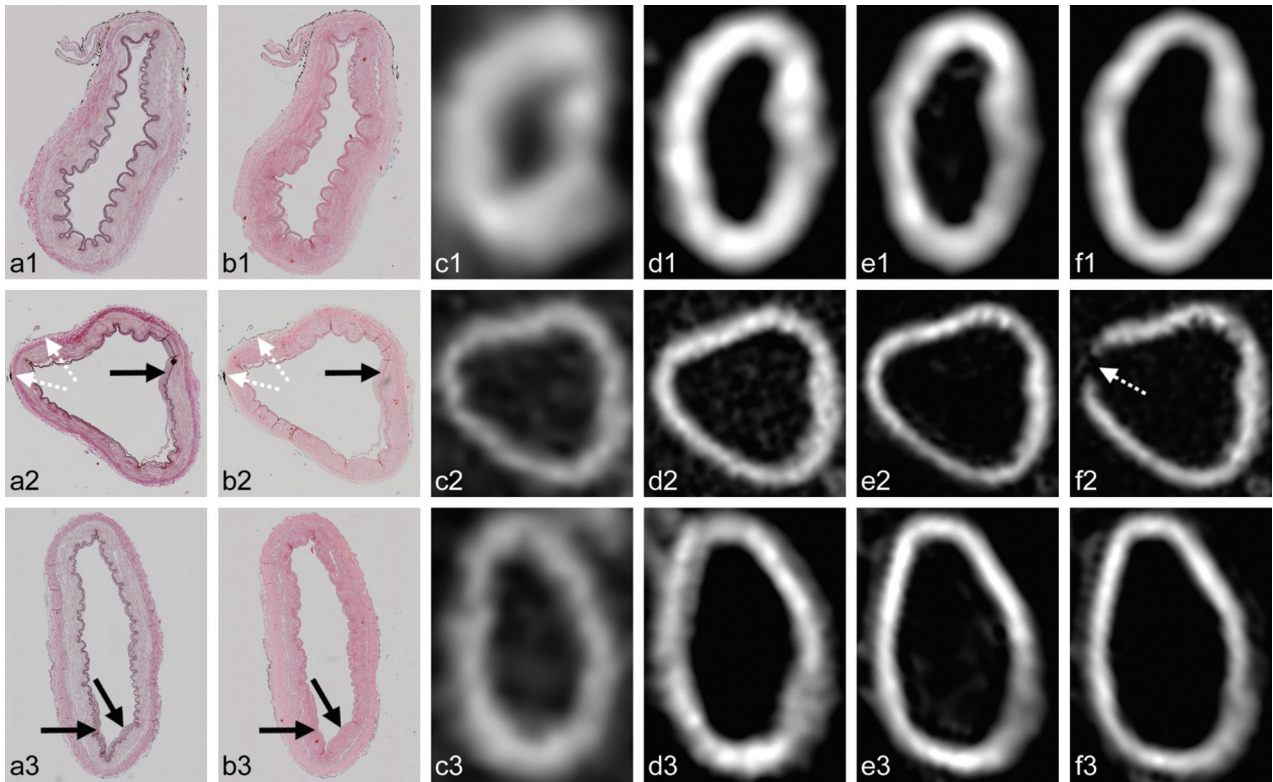
Subject Sex, Age (yr) ^a	Artery	Heterogeneity on MRI	Signal Intensity ^b				Class ^c	Correlation MRI versus Histology
			T1	PD	T2	T2*		
M, 87	R VA	Focal "spot" within wall	↓	↓	↓	↓	IT	Intima-media artifacts
	MidBA	Local inner rim	=	=	↓	↓	FS	No correlation
	R MCA	Line within wall (almost circumf.)	↓	↓	↓	↓	F	Intima-media artifacts/foamy macrophages
		Inner rim (almost circumf.)	=	=	↑	↑	F	Increased collagen
	L MCA	Thickening ("core")	↓	↓	=/↓	=/↓	FL	Lipid core
		Inner rim	=/↑	↑	↑	↑	FL	Increased collagen
	R ICA	Thin local line within wall	↓	↓	↓	↓	F	Intima-media artifacts/foamy macrophages
		Local thickening	↑	=/↑	↑	↑	F	No correlation
		Local area	↓	=/↓	=/↓	↓	F	Foamy macrophages
	L ICA	Thick local inner rim	=	↑	↑	↑	F	Increased collagen
		Line within wall (almost circumf.)	↓	↓	↓	↓	F	Intima-media artifacts
		Local area	=/↑	↓	↓	↓	F	Foamy macrophages
F, 74	R VA	Local lines within wall	=	↓	↓	↓	FS	Intima-media artifacts/foamy macrophages
	Prox-BA	Focal line within wall	=	↓	↓	↓	IT	Intima-media artifacts
	R PCA	Local line within wall	=	↓	↓	↓	FS	Intima-media artifacts
		Inner rim	↑	↑	↑	↑	FS	No correlation
	L PCA	Patchy "spots" within wall	=	↓	↓	↓	IT	Intima-media artifacts
		Focal inner rim "spots"	=	=	↑	↑	IT	No correlation
	L MCA	Thickening ("core")	↓	↓	↓	↓	Path.IT	Foamy macrophages and proteoglycans
		Inner rim	=	↑	↑	↑	Path.IT	Increased collagen
	R ICA	Local line within wall	=/↑	=/↑	↓	↓	F	Intima-media artifacts
		Focal inner rim "spots"	=	↑	↓	↓	F	Increased collagen
	L ICA	Line within wall	=	↓	↓	↓	IT	Intima-media artifacts
	F, 65	Prox-BA	Lines within wall	=	↓	↓	↓	FS
MidBA		Patchy "spots" within wall	↑	↑	=/↑	=/↑	IT	No correlation
M, 54	L ICA	Local line within wall	=	↓	↓	↓	IT	No correlation
		Focal inner "spot"	↑	↑	↑	↑	IT	No correlation
M, 71	R VA	Thickening ("core") 2 locations	↓	=	=	↓	F	Less collagen/artifacts
		Thick local inner rim 2 locations	=	=	↑	↑	F	Increased collagen
	L VA	Local line within wall	↓	↓	↓	↓	F	Foamy macrophages
		Focal inner area	↑	↓	↓	↓	F	Increased collagen
	Dist-BA	Focal protruding thickening	↑	↑	↑	↑	Path.IT	Foamy macrophages and proteoglycans
	R ICA	Thickening ("core")	↓	↓	↓	↓	Path.IT	Foamy macrophages and proteoglycans
		Local inner rim	=	=	=	=	Path.IT	Increased collagen
L ICA	Large thickened area	↓	↓	↓	↓	F	Foamy macrophages	
		Thin inner rim	↑	↓	↓	↓	F	Increased collagen

Note:—Circumf. indicates circumferential; MidBA, middle part of basilar artery; R, right; L, left; VA, vertebral artery; Prox-BA, proximal part of basilar artery; Dist-BA, distal part of basilar artery; =, isointense to surrounding healthy vessel wall; ↓, hypointense to surrounding healthy vessel wall; ↑, hyperintense to surrounding healthy vessel wall; PCA, posterior cerebral artery; F, fibrous plaque; FL, fibrolipid plaque; FS, fatty streak; IT, intimal thickening; Path.IT, pathologic intimal thickening.

^a Sex and age at death of the 5 subjects in whom circle of Willis specimens were used in this study.

^b Signal intensity of the described vessel wall lesion on each of the 4 image contrast weightings.

^c Classification according to the modified American Heart Association classification by Virmani et al.²⁵



ON-LINE FIGURE. Three examples of no or early lesions without signal heterogeneity on 7T MR images. Histologic sections (magnification $\times 10$) with Van Gieson elastic (a) and H&E (b) staining, with corresponding 7T MR images of the T1-weighted (c), PD-weighted (d), T2-weighted (e), and T2*-weighted (f) sequences. *a1–f1*, Cross-section of the left posterior cerebral artery of subject 4. Histologic examination shows no anomalies, reflected in a homogeneous signal intensity throughout the whole vessel wall on all sequences. *a2–f2*, Cross-section of the right MCA of subject 2. Histologic examination shows intimal thickening (black arrow in *a2* and *b2*), which is not seen as signal heterogeneity of the vessel wall on MR images. Artifacts from the fiducial can be seen on the T2*-weighted image (*f2*), corresponding to black ink on the histologic sections (dashed white arrows, *a2* and *b2*). *a3–f3*, Cross-section of the left vertebral artery of subject 1. Histologic examination shows intimal thickening (black arrows in *a3* and *b3*), which is not seen as signal heterogeneity of the vessel wall on the MR images.