

Blood pool enhanced MRA of carotid arteries: added value of steady state imaging.

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PURPOSE

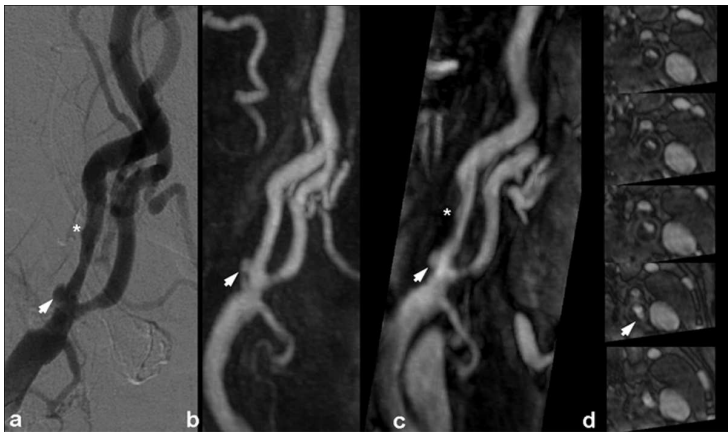
To evaluate the diagnostic accuracy of Vasovist enhanced-MRA in the assessment of carotid arteries stenosis by using DSA as reference modality, to determine the value of first-pass (FP), steady-state (SS) and combined (FP+SS) reading.

METHOD AND MATERIALS

This study received the approval of the Local Ethics Committee and all subjects gave written informed consent. MRA and DSA were performed in 84 patients with carotid stenosis at Doppler Ultrasonography. Three readers reviewed MRA datasets (FP, SS, FP+SS) and one independent observer evaluated DSA images for the assessment of stenosis degree, plaque morphology/ulceration, stenosis length and tandem lesions. Interobserver agreement for MRA was analyzed by intraclass correlation (ICC) and Cohen-k coefficients. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated, using McNemar test to determine significant differences ($p < 0.05$).

RESULTS

Interobserver agreement was substantial for all MRA reading modalities. For the grading of stenosis, sensitivity, specificity, PPV and NPV were 90%, 92%, 91.1% and 91% at FP; 95%, 95.4%, 95% and 95.4% at SS; 96.2%, 98.8%, 98.7% and 96.6% at FP+SS. For the evaluation of plaque morphology, calculated values were 83.7%, 86.4%, 87.8% and 82.0% at FP; 97.6%, 97.3%, 97.6%, 97.3% at SS; 97.6%, 100%, 100% and 97% at FP+SS. Differences between FP, SS and FP+SS were significant for stenosis degree and plaque morphology ($p < 0.001$).



Ulcerated plaque of the right ICA. DSA (a) shows a severe (NASCET grade IV) stenosis of the right ICA with a deep ulcer niche (arrows). Same findings are confirmed at both FP (b) and SS acquisitions (c, d). A smaller ulceration (asterisk) was only visible at DSA and SS.

FP	DSA	
	REGULAR	IRREGULAR
REGULAR	79	9
IRREGULAR	9	71

SS	DSA	
	REGULAR	IRREGULAR
REGULAR	86	3
IRREGULAR	2	77

FP + SS	DSA	
	REGULAR	IRREGULAR
REGULAR	87	4
IRREGULAR	1	76

FP	DSA	
	NOT ULCERATED	ULCERATED
NOT ULCERATED	60	2
ULCERATED	5	13

SS	DSA	
	NOT ULCERATED	ULCERATED
NOT ULCERATED	63	0
ULCERATED	2	15

FP + SS	DSA	
	NOT ULCERATED	ULCERATED
NOT ULCERATED	64	0
ULCERATED	1	15

Diagnostic performance of the three modalities (FP, SS and FP + SS) in the assessment of plaque morphology and ulcers.

CONCLUSION

Vasovist enhanced MRA is a promising technique for the imaging of carotid artery stenosis. SS imaging is superior to FP, but the combined reading appears more fast and effective.