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Cost-Effective CT & MRI Contrast Agents



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# AJNR

This information is current as  
of August 17, 2025.

**In Re: Griffiths PD, Hoggard N, Warren  
DJ, Wilkinson ID, Anderson B,  
Romanowski CA. Brain Arteriovenous  
Malformations: Assessment with Dynamic  
MR Digital Subtraction Angiography.  
AJNR Am J Neuroradiol 21:1892–1899**

Joachim Klisch

*AJNR Am J Neuroradiol* 2001, 22 (8) 1633  
<http://www.ajnr.org/content/22/8/1633>

erence list of the article, and we would like to bring to your attention that MR-DSA already could be performed with two frames per second, as described in our February 2000 article in *Neuroradiology* (2), as well as described by Strecker et al (3, 4). MR-DSA today can be performed with four frames per second when the projection sequence is combined with view-sharing techniques (R. Strecker, personal communication). Postprocessing of images in MR-DSA according to the algorithm proposed for functional MR imaging offers several advantages with significant improvement of signal-to-noise ratio of up to a factor of three, background suppression without subtraction, and clear artery-vein separation, even in brain vessels. By the use of these modifications, MR-DSA becomes a promising clinical tool, in the assessment of dural AVMs and brain AVMs. However, all MR-DSA techniques described cannot replace catheter angiography, with its high anatomic and temporal resolution, for planning endovascular therapy.

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## References

1. Griffiths PD, Hoggard N, Warren DJ, Wilkinson ID, Anderson B, Romanowski CA. **Brain arteriovenous malformations: assessment with dynamic MR digital subtraction angiography.** *AJNR* 2000;21:1892-1899
2. Klisch J, Strecker R, Hennig J, Schumacher M. **Time-resolved projection MRA: clinical applications in intracranial vascular malformations.** *Neuroradiology* 2000;42:104-107
3. Strecker R, Scheffler K, Klisch J, et al. **Fast functional MRA using time-resolved projection MR-angiography with correlation analysis.** *Magn Reson Med* 2000;43:303-309
4. Strecker R, Lehnhardt S, Klisch J, Hennig J. **Functional MRA combining 2D MR DSA and correlation analysis.** *Proc Intl Magn Reson Med* 1999;7:484

## Dynamic MR Digital Subtraction Angiography

I read with interest the article by Griffiths et al published in the *AJNR* (1), in which the authors describe the early experience with an experimental dynamic MR angiographic method using a contrast agent and a digital mask for cerebral arteriovenous malformation (AVM) assessment. We enjoyed Griffiths et al's article because they show again that MR digital subtraction angiography (DSA) is a noninvasive, dynamic angiographic tool. It should be noted that there are missing references in the ref-