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N. Anzalone

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COMMENTARY

MR Angiography Follow-Up of Aneurysms Treated with Coils: Is There a Need for the Use of Gadolinium?

The authors of "MR Angiographic Follow-Up of Intracranial Aneurysms Treated with Detachable Coils: Evaluation of a Blood-Pool Contrast" report a series of 37 cerebral aneurysms treated with coils studied at 1.5T with time-of-flight (TOF) MR angiography (MRA) and contrast-enhanced (CE) MRA with a steady-state technique after the injection of a blood-pool contrast agent (Gadofosveset, Vasovist; Bayer Schering Pharma, Berlin, Germany). They concluded that the use of Vasovist did not significantly increase the accuracy of follow-up MRA. On the other hand, CE-MRA showed a tendency toward higher accuracy for the detection of aneurysm remnants than TOF-MRA, though the difference was not statistically significant.

Their results are similar to those of other studies performed at 1.5T in which conventional gadolinium (Gd) agents were used both with TOF-MRA techniques and first-pass CE-MRA acquisitions.[1-4] The use of high resolution steady-state acquisition with a blood-pool agent is similar to that of extracellular contrast media enhanced TOF-MRA, in which veins also enhance and overlap the arterial structures, in some cases giving false-positive images of aneurysm recanalization. With blood-pool agents, the risk of complete enhancement of both arteries and veins is more likely, potentially leading to more false-positive findings. In fact, a false-positive finding was reported in the present series.

The use of appropriate first-pass CE-MRA techniques allows pure enhancement of only arteries. In some cases, residual neck portions of coiled aneurysms are even better displayed than with digital subtraction angiography (DSA).[5] Nevertheless, some authors[2] have not found significant improvements with the use of CE-MRA compared with unenhanced TOF acquisitions. In our personal experience,[4] we found better evidence of small remnants (Raymond type 1) after CE-MRA and better delineation of the recanalization in larger residual portions (Raymond type 2).

TOF techniques are prone to saturation effects at areas of slow or complex flow and to susceptibility artifacts due to coil packing. For follow-up of treated aneurysms, susceptibility artifacts and flow sensitivity are more prominent and can interfere with the evaluation. We have noted that in some cases in which an aneurysm neck is close to the parent artery, the artery is hidden by artifacts. If the parent artery is not completely evident, it is impossible to state that the aneurysm is closed. Due to the shorter TE values, CE-MRA acquisitions are less influenced by susceptibility artifacts, and consequently, parent arteries are always evident, at least in our experience. Similar results have been also demonstrated at 3T.[6,7]

The problem with CE techniques is that their real advantage over TOF acquisitions is in the demonstration of small type 1 remnants; however, such remnants are not considered treatable by most interventionists. We do not yet know how many of these residual aneurysms will grow to become treatable, and consequently, we do not really know how relevant or how important the advantage of CE-MRA actually is from a clinical perspective. We need more studies and greater follow-up information to understand better the relevance of these small remnants that are sometimes not even visible on DSA.

In conclusion, it seems from this study that blood-pool agents do not provide any additional information over conventional Gd agents for the demonstration of residual aneurysm remnants after coiling. Indeed, their use with steady-state sequences may actually lead to greater venous contamination. In general, the use of conventional Gd agents in CE-MRA acquisitions is still a matter for debate, particularly with regard to the kind of acquisition performed and the interpretation of results. Their use allows clearer demonstration of the remnant when present, but the clinical relevance of finding very small remnants has still to be demonstrated.

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N. Anzalone
Department of Neuroradiology
Scientific Institute H.S. Raffaele
Milan, Italy

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