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and TE values are less than optimal for the small, relatively nonmyelinated neonatal brain. Optimization of head coil design for use in neonates, availability of diffusion-weighted sequences, and general availability of software that allows rapid quantification of diffusion data would also be useful. Consensus among clinicians and academicians relating to these matters, perhaps achieved through the efforts of one of our professional societies, may be a needed stimulus to vendor development of optimized capabilities. As we attempt to achieve our expectations relative to the utility of neonatal MR imaging, such a process could also be a stimulus to a more thorough characterization of underlying clinical alterations (1, 2) and to more effective study design.

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Subarachnoid Hemorrhage due to Late Recurrence of a Previously Unruptured Aneurysm after Complete Endovascular Occlusion

Endovascular treatment of intracranial aneurysms has evolved over the last 10 years, with continuous improvement in embolic devices and their reliability and steady amelioration in anatomic and clinical results.

Early experience with detachable latex or silicone balloons as embolic devices led to suboptimal anatomic results and to frequent catastrophic rehemorrhage. A detachable balloon, filled with either contrast medium or HEMA, behaved as a solid intraaneurysmal implant that transmitted the arterial pressure to the wall of the aneurysm and ultimately led to recanalization and rupture of the aneurysm. Substitution of the balloon with pushable thrombogenic stainless steel coils improved the anatomic and clinical results, although the release mechanism remained very unreliable, and complete obliteration of the aneurysm remained unattainable.

Introduction of the Guglielmi detachable coil added a significant versatility and a sense of confidence and reliability to the endovascular treatment of intracranial aneurysms. For the first time, the endovascular therapist could introduce and/or remove an embolic device from an aneurysm without any significant trauma to its fragile wall. The softness and malleability of the platinum coils allowed for dense packing and obliteration of the aneurysm. In addition, and unlike detachable balloons or other devices, platinum coils deflect blood flow from the neck of the aneurysm and do not transmit the arterial pressure to the wall. The experimental work of Strothers on the hemodynamics of the inflow and outflow zones of an aneurysm added to our understanding of this vascular lesion and led to better use of the embolic device. Significant research is being conducted on refining the endovascular technique and producing better embolic devices for the treatment of aneurysms, such as the use of neck bridges, semiliquid fillers, expandable embolic material, and so on.

It is within this context of evolving and continuously improving technology that the article by Hodgson et al in this issue of the *American Journal of Neuroradiology* (page 1939) is taken into account. The authors report on the delayed rupture of a previously unruptured middle cerebral artery (MCA) aneurysm 18 months after its obliteration with platinum coils. We wholeheartedly agree with the authors that even though the short and intermediate results of endovascular treatment of aneurysms may be favorable, the long-term clinical outcome remains uncertain.

However, a few comments have to be made in reference to the clinical case that the authors report. In our clinical practice, this particular MCA aneurysm would not have been considered a good candidate for endovascular obliteration but rather would have been referred for surgical clipping. We would have refrained from any endovascular procedure on this aneurysm owing to its relatively large size, the width of its neck, and the uncertain anatomic relationship of the neck to the adjacent normal branches of the MCA. In addition, in our surgical practice, the morbidity associated with surgical clipping of unruptured aneurysms in this peripheral location is very low. Also, the packing of the aneurysm with coils is loose and not as dense as we would like to achieve. In our practice, this aneurysm would not have been considered completely obliterated. The 6-month follow-up arteriogram showed the aneurysm to be incompletely occluded and there was a residual neck. In this anatomic location (MCA trifurcation), the complex relationship of the neck of the aneurysm to the adjacent normal branches is difficult to understand and often leads to incomplete packing of the aneurysm for fear of encroachment of the coils on normal branches. In general, we avoid the endovascular treatment of aneurysms in this anatomic location, particularly if they are unruptured or if the patient scores low on the Hunt and Hess scale (grade 0, I, or II).

As much as possible, we try to follow certain anatomic and clinical criteria that favor endovascular treatment when deciding on the management of an aneurysm: a) small size of the aneurysm; b) small aneurysmal neck; c) favorable ratio of the largest diameter of the aneurysm to the size of its neck; d) lateral aneurysm not subjected to high-flow dynamics; e) ruptured aneurysm occurring in patients with a high Hunt and Hess grade; f) large amount of blood on the CT scan; g) ruptured midline aneurysm, such as in the region of the anterior communicating artery; and h) patients with otherwise poor surgical risk.

Nevertheless, the article by Hodgson et al is valuable inasmuch as it brings to light what most investigators have said repeatedly: that the long-term clinical outcome of endovascular treatment of aneurysms is not yet proved and remains to be validated. As sobering and or depressing as this report may be, it should not in any way distract us from ever improving and refining endovascular techniques, which, in my opinion, represent the future of aneurysm treatment.

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